TEST REPORT

IMT cellular networks; Harmonised Standard for access to radio spectrum

Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)

Report Reference No. ..... :	422879-3TRFWL	
Tested by (name, function and signature) ..... :	P. Barbieri	(project handler)
Approved by (name, function and signature) ..... :	D. Guarnone	(verifier)
Date of issue ..... :	2021-05-31	
Testing Laboratory ..... :	**Nemko Spa**	
Address ..... :	Via del Carroccio, 4 – 20853 Biassono (MB) – Italy	
Testing location	Nemko Spa	
Address ..... :	Via del Carroccio, 4 – 20853 Biassono (MB) – Italy	
Applicant's name ..... :	**Aesys SpA**	
Address ..... :	Via Artigiani, 41 – 24060 Brusaporto (BG) – Italy	
Test specification:		
Standard ..... :	ETSI EN 301 908-1 V13.1.1 – ETSI EN 301 908-13 V13.1.1	
	Full application of the standards	☐
	Partial application of the standards	☒
Test procedure ..... :	Nemko WM L0077, WM L0177 and WM L1002	
Test Report Form No. ..... :	301908TRFEMC	
TRF Originator ..... :	Nemko Spa	
Master TRF ..... :	2017-10	

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Test item description ..... :	**Monitor**
Trade Mark ..... :	aesys
Manufacturer ..... :	Aesys SpA
Address of manufacturer ..... :	Via Artigiani, 41 – 24060 Brusaporto (BG) – Italy
Code ..... :	993202033501
Model name ..... :	CPTOU4615 LS P1L3ARIO2HS24G1WTTSPFACZ0
Ratings ..... :	220 – 240 V~, 50 / 60 Hz

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Test Report No. : 422879-3TRFWL	2021-05-31 Date of issue

Short description of the EuT	Copy of marking plate
The E.U.T. a information monitor provided with an internal PC. The EUT use the following separatly approved radio module: - LTE/HSPA+/GSM module SIMCom model SIM7100E-PCIE - WIFI radio module Sparklan model WUBA-171GN - PMR radio module Elancitè model NF S32-002 - Antenna type Invax model DR70 The EUT is provided also with a slim soundbar code 993301701000 (Slim Soudbar 46" MC).	

Number of tested samples:	1
Serial number:	899707
Antenna type:	External connector with dedicated antenna
Operational Frequency band:	LTE B1, B3, B7, B8, B20, B38 and B40
Equipment use:	Fixed equipment
Accessories and detachable parts included:	The E.U.T. is composed of a single unit
Other options included:	--

Testing

Date of receipt of test sample:	2021-05-13
Testing commenced on:	2021-05-17
Testing concluded on:	2021-05-28

Possible test case verdicts:

test case does not apply to the test object:	N (Not applicable)
test object does meet the requirement:	P (Pass)
test object does not meet the requirement:	F (Fail)

Symbols used in this test report

☒ The crossed square indicates that the listed condition or equipment is applicable for this report.

☐ The empty square indicates that the listed condition or equipment is not applicable for this report.

Throughout this report point is used as decimal separator.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

Verdict according to the standards on page 5:	**Pass**

PROJECT HISTORY		
Report number	**Modification to the report / comments**	**Date**
422879-3TRFWL	First release	2021-05-31
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REMARKS		

PRODUCT VARIANTS		
Variant model	**Difference against the main model**	**Additional test performed**
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REMARKS		

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1 TEST STANDARDS

The tests were performed according to following standards and procedures.

NEMKO WM L0177: General routines for using instruments at Nemko

NEMKO WM L1002: Measurement Uncertainty - Policy and Statement

NEMKO WM L0077: General routines to perform EMC tests

ETSI EN 301 908-1 V13.1.1
IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 1: Introduction and common requirements

ETSI EN 301 908-13 V13.1.1
IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)

2 SUMMARY OF TEST RESULTS

Harmonized Standard ETSI EN 301 908-1				
Requirement		Requirement Conditionally		Test Result
No	Description	U/C	Condition	
1	Radiated emissions (UE)	U		P

Harmonized Standard ETSI EN 301 908-13				
Requirement		Requirement Conditionally		Test Result
No	Description	U/C	Condition	
1	Transmitter maximum output power	U		P
3	Transmitter spurious emissions	U		P

Remark: The EUT is use a separately approved radio module, so the standard has been partially applicated.

3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage:	☒	230 V / 50 Hz / 1ϕ	☐	115 V / 60Hz / 1ϕ
	☐	400 V / 50 Hz 3PE	☐	400 V / 50 Hz 3NP
	☐	12 V DC	☐	24 V DC

3.2 EuT operation modes

Mode	Description
1	TX mode forced by a radio communication tester

3.3 EuT Configuration modes

The EuT was configured to measure its highest possible radiation level. The test modes selected are according to EuT instruction manual.

Mode	Description
1	The EUT has been connected to the mains with the Ethernet cable connected to a PC.

3.4 Input/Output Ports

Port	Name	Type*	Cable Max. >3m	Cable Shielded	Description
0	Enclosure	N/E	—	—	—
1	AC mains	AC	☒	☐	Three wires cable
2	Ethernet line	TP	☒	☒	Standard cable

*Note:

AC = AC Power Port DC = DC Power Port N/E = Non-Electrical

I/O = Signal/Control Input or Output Port TP = Telecommunication Port ANT = Antenna Port

3.5 Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
AE	PC	—	—	—
AE	Radio communication tester	R&S	CMW 290	—
AE	PMR Remote control	Okeenea	TX1-BUZ	—
AE	IR Remote control	Meliconi	Speedy 2 combo	—

Note: * Use

EUT - Equipment Under Test

AE - Auxiliary/Associated Equipment (Not Subjected to Test)

SIM - Simulator (Not Subjected to Test)

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

Nemko Spa
Via del Carroccio, 4
20853 Biassono (MB) – Italy

Tests site/benches are in accordance with applicable standard/s, and have been utilized under Nemko Spa testing engineer

4.2 Environmental conditions

In the laboratory, the following ambient conditions are respected for each test reported below:

Ambient temperature:	18 ÷ 33 °C (1)
Relative Humidity:	25 ÷ 70 % (2)
Atmospheric pressure:	860 ÷ 1060 hPa

(1) For luminaire, temperature during tests was verified to be within 18 ÷ 30 °C
(2) During ESD test, humidity was verified to be within 30 ÷ 60 %

The following instruments are used to monitor the environmental conditions:

Equipment	Manufacturer	Model	Serial N°
Thermo-hygrometer data loggers	Testo	175-H2	20012380/305
Thermo-hygrometer data loggers	Testo	175-H2	38203337/703
Barometer	Castle	GPB 3300	072015

4.3 Statement of the measurement uncertainty

The measurement uncertainty was calculated for each test and quantity listed in this test report, according to CISPR 16-4-2 and other specific test standard and is documented in Nemko Spa working manual WML1002.

The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report:

P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit.

F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Hereafter Nemko's measurement uncertainties are reported:

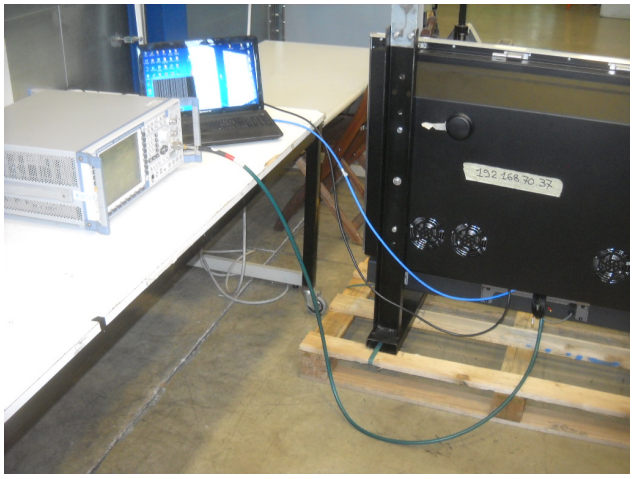
EUT	Type	Test	Range	Measurement Uncertainty	Notes
Transmitter	Conducted	Frequency error	0.001 MHz ÷ 40 GHz	0.08 ppm	(1)
		Carrier power RF Output Power	0.009 MHz ÷ 30 MHz	1.1 dB	(1)
			30 MHz ÷ 18 GHz	1.5 dB	(1)
			18 MHz ÷ 40 GHz	3.0 dB	(1)
			40 MHz ÷ 140 GHz	5.0 dB	(1)
		Adjacent channel power	1 MHz ÷ 18 GHz	1.4 dB	(1)
		Conducted spurious emissions	0.009 MHz ÷ 18 GHz	3.0 dB	(1)
			18 GHz ÷ 40 GHz	4.2 dB	(1)
			40 GHz ÷ 220 GHz	6.0 dB	(1)
		Intermodulation attenuation	1 MHz ÷ 18 GHz	2.2 dB	(1)
		Attack time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Attack time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
		Release time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Release time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
		Transient behaviour of the transmitter– Transient frequency behaviour	1 MHz ÷ 18 GHz	0.2 kHz	(1)
		Transient behaviour of the transmitter – Power level slope	1 MHz ÷ 18 GHz	9%	(1)
		Frequency deviation - Maximum permissible frequency deviation	0.001 MHz ÷ 18 GHz	1.3%	(1)
		Frequency deviation - Response of the transmitter to modulation frequencies above 3 kHz	0.001 MHz ÷ 18 GHz	0.5 dB	(1)
		Dwell time	-	3%	(1)
		Hopping Frequency Separation	0.01 MHz ÷ 18 GHz	1%	(1)
		Occupied Channel Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
		Modulation Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
	Radiated	Radiated spurious emissions	0.009 MHz ÷ 26.5 GHz	6.0 dB	(1)
			26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)
		Effective radiated power transmitter	10 kHz ÷ 26.5 GHz	6.0 dB	(1)
			26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)
Receiver	Radiated	Radiated spurious emissions	0.009 MHz ÷ 26.5 GHz	6.0 dB	(1)
			26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)
		Sensitivity measurement	1 MHz ÷ 18 GHz	6.0 dB	(1)
	Conducted	Conducted spurious emissions	0.009 MHz ÷ 18 GHz	3.0 dB	(1)
			18 GHz ÷ 40 GHz	4.2 dB	(1)
			40 GHz ÷ 220 GHz	6.0 dB	(1)

NOTES:
(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 %

5 TEST CONDITIONS AND RESULTS

5.1 Transmitter maximum output power

5.1.1 Photo documentation of the test set-up



5.1.2 Test method

The transmitter output power is the average value of the power delivered to an artificial antenna. The EUT has been tested connected to a spectrum analizer as specified in clause 5.3.1 of ETSI EN 301 908-13.

5.1.3 Limits

The UE maximum output power shall be within the shown value in the following table:

E-UTRA Band	Power Class 3 (dBm)	Tolerance (dB)
1	23	+2.7
3	23	+2.7
7	23	+2.7
8	23	+2.7
20	23	+2.7
38	23	+2.7
40	23	+2.7

5.1.4 Test result

Standard	Channel	RF measured (dBm)	Antenna gain (dB)	RF output power (dBm)
LTE B1	MID	18.4	2	20.4
LTE B3	MID	18.7	2	20.7
LTE B7	MID	16.0	2	18.0
LTE B8	MID	19.9	2	21.9
LTE B20	MID	19.5	2	21.5
LTE B38	MID	16.8	2	18.8
LTE B40	MID	16.2	2	18.2

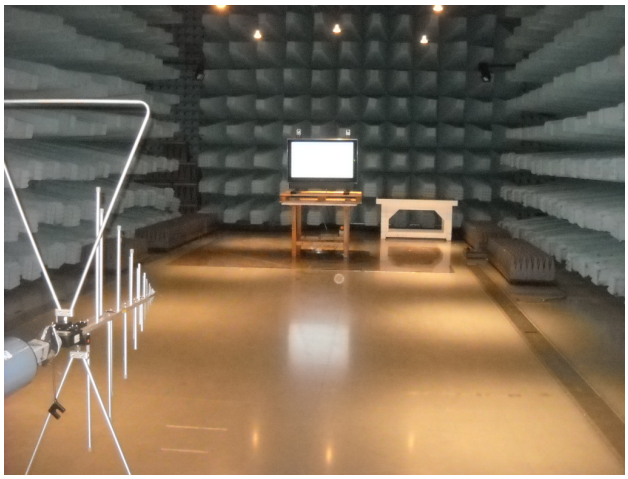
Verdict:	☒ P ☐ F ☐ N
Operation mode:	1
Configuration mode:	1
Kind of test site:	Shielded room
Remarks:	

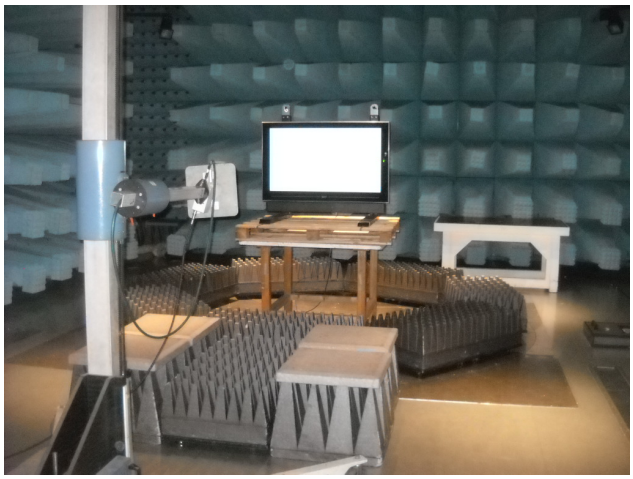
5.1.5 Test equipment used

Equipment	Manufacturer	Model	Serial N°
EMI receiver (2 Hz ÷ 44 GHz)	R&S	ESW44	101620
Redio communication tester	R&S	CMW290	2.488
Shielded room	Siemens	Conducted emission test room	1862

5.2 Unwanted emissions in the spurious domain

5.2.1 Photo documentation of the test set-up





5.2.2 Test method

Transmitter unwanted emissions in the spurious domain are emissions outside the allocated band and outside the out-of-band domain.

For radiated emissions, the equipment was placed at the specified height on an isolated support and in the position closest to normal use as declared by the provider. The test antenna was oriented initially for vertical polarization. The output of the test antenna was connected to the measuring receiver. The transmitter was switched on with modulation. The test antenna was raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. The measurement was repeated with the test antenna orientated for horizontal polarization.

For conducted emissions, the antenna port of the EUT was connected directly to a spectrum analyser.

5.2.3 Limits

ETSI EN 301 908-1		
Frequency range	**Minimum requirement**	**Bandwidth**
30 MHz to 1000 MHz	-36 dBm e.r.p.	100 kHz
1 GHz to 12.75 GHz	-30 dBm e.r.p.	1 MHz

ETSI EN 301 908-13		
Frequency range	**Emission limit**	**Bandwidth**
9 kHz to 150 kHz	-36 dBm.	1 kHz
150 kHz to 30 MHz	-36 dBm	10 kHz
30 MHz to 1000 MHz	-36 dBm	100 kHz
1 GHz to 12.75 GHz	-30 dBm	1 MHz

5.2.4 Test result

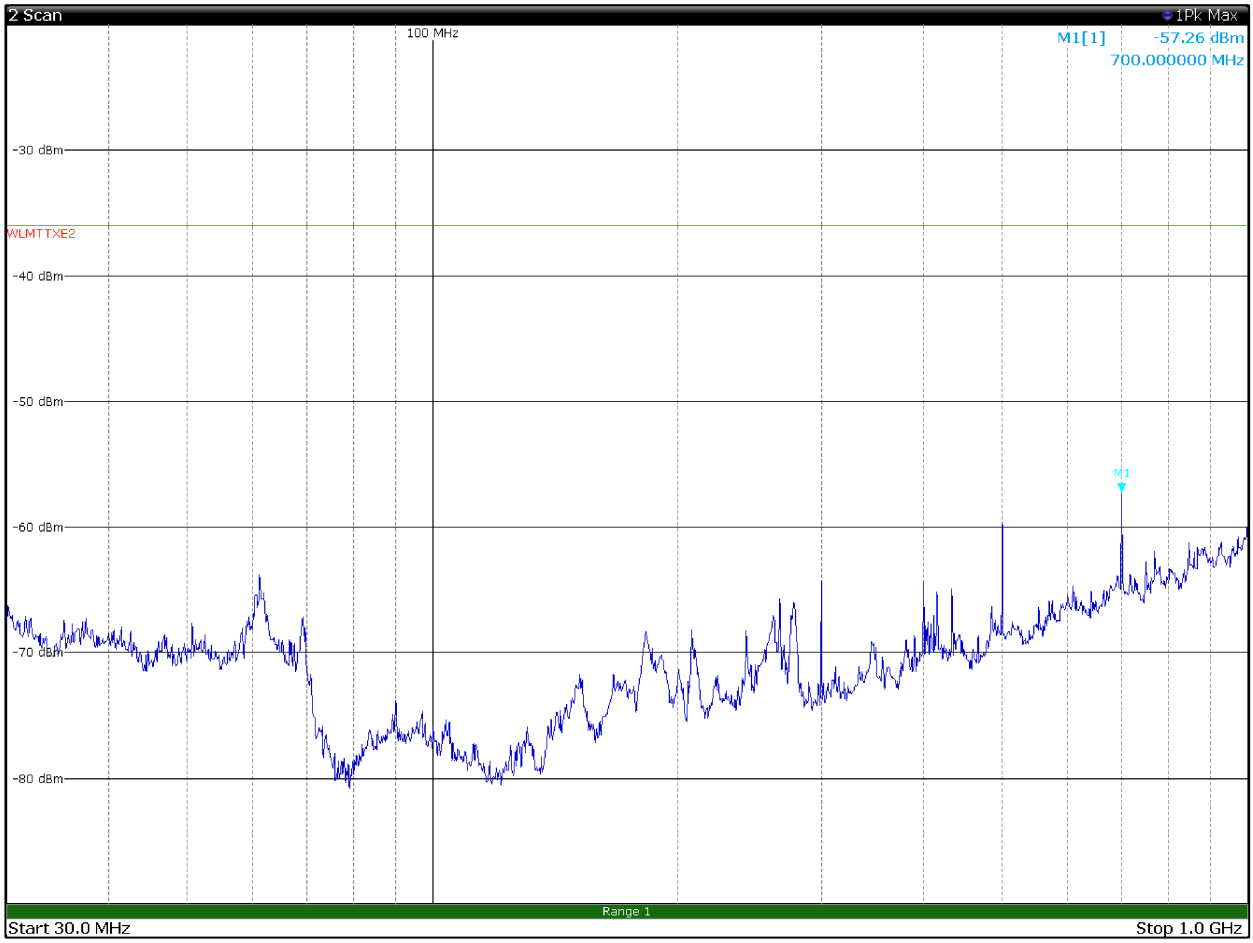
Verdict:	☒ P ☐ F ☐ N
Frequency range:	30 MHz to 12.75 GHz
Measurement distance:	3 m and 10 m
Kind of test site:	Semi anechoic chamber
Remarks:	

5.2.5 Test equipment used

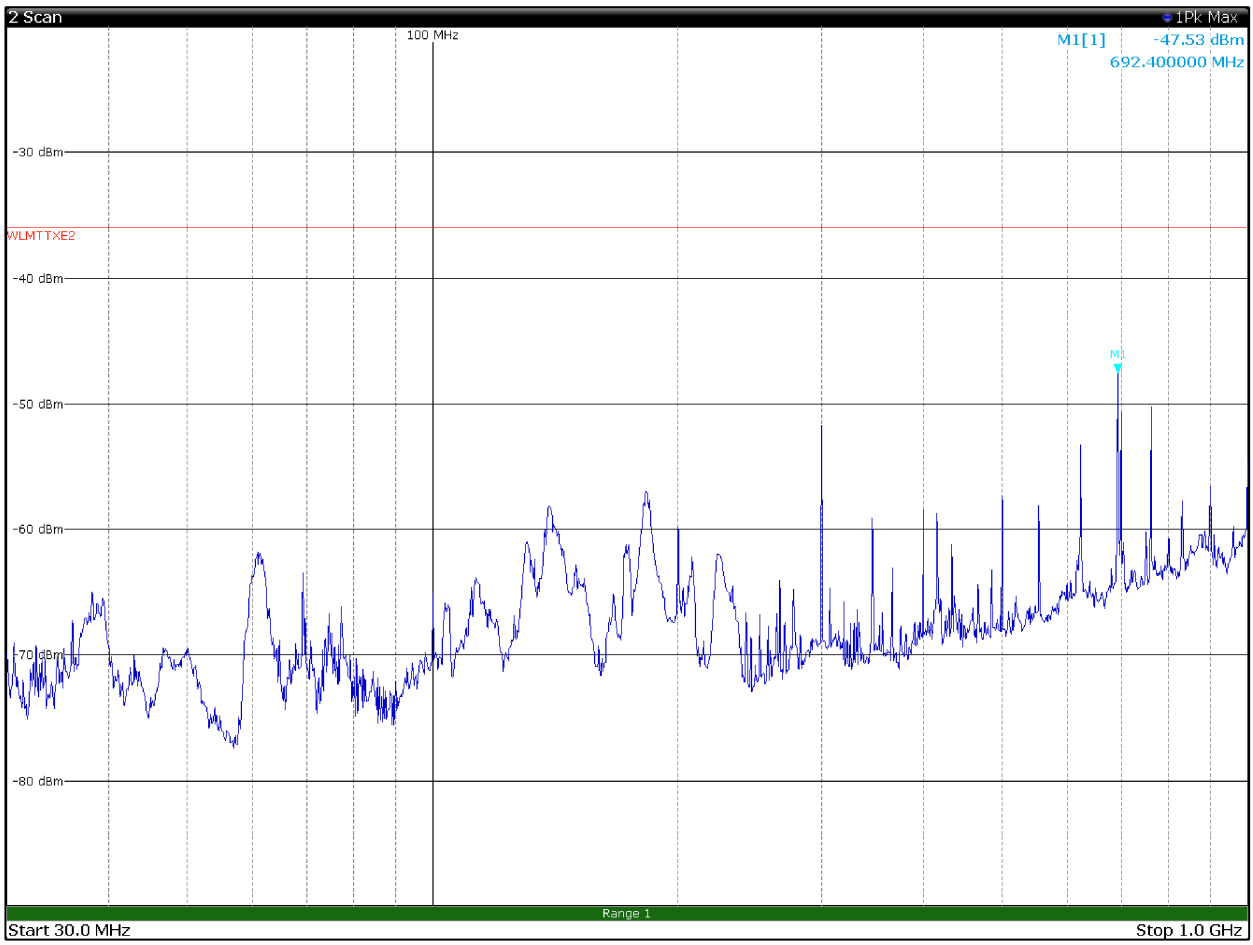
Equipment	Manufacturer	Model	Serial N°
EMI receiver (2 Hz ÷ 44 GHz)	R&S	ESW44	101620
Trilog Antenna (25 MHz ÷ 2 GHz)	Schwarzbeck	VULB 9162	9162-025
Bilog antenna (1 ÷ 18 GHz)	Schwarzbeck	STLP 9148-123	123
Broadband preamplifier (1 ÷ 18 GHz)	Schwarzbeck	BBV 9718	9718-137
Controller	Maturo	FCU3.0	10041
Tilt antenna mast	Maturo	TAM4.0-E	10042
Turntable	Maturo	TT4.0-5T	2.527
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530
Shielded room	Siemens	10m control room	1947

5.2.6 Test protocol

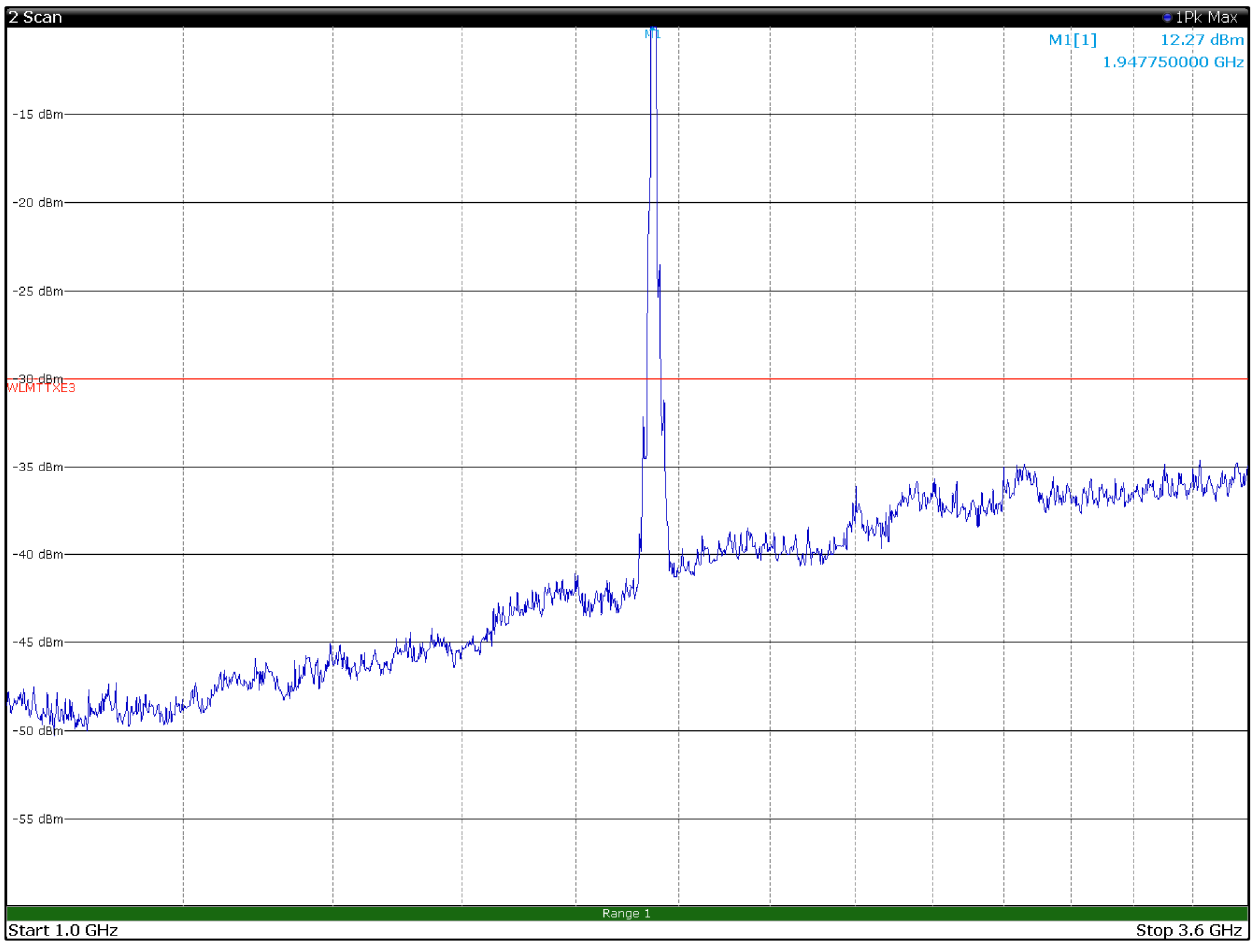
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B1
Remarks: Frequency range 30 to 1000 MHz



Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B1
Remarks: Frequency range 30 to 1000 MHz

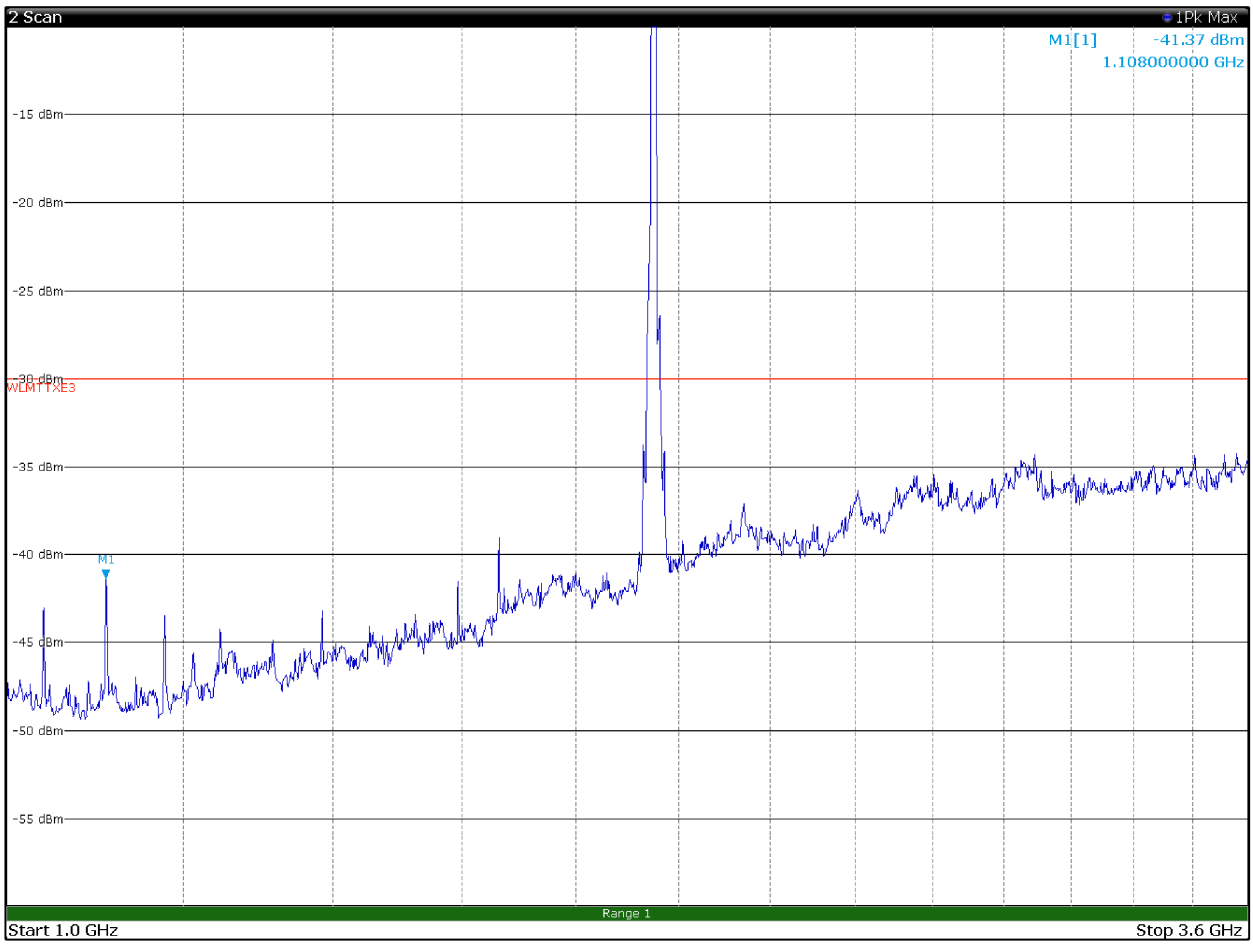


Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B1
Remarks: Frequency range 1 to 3.6 GHz



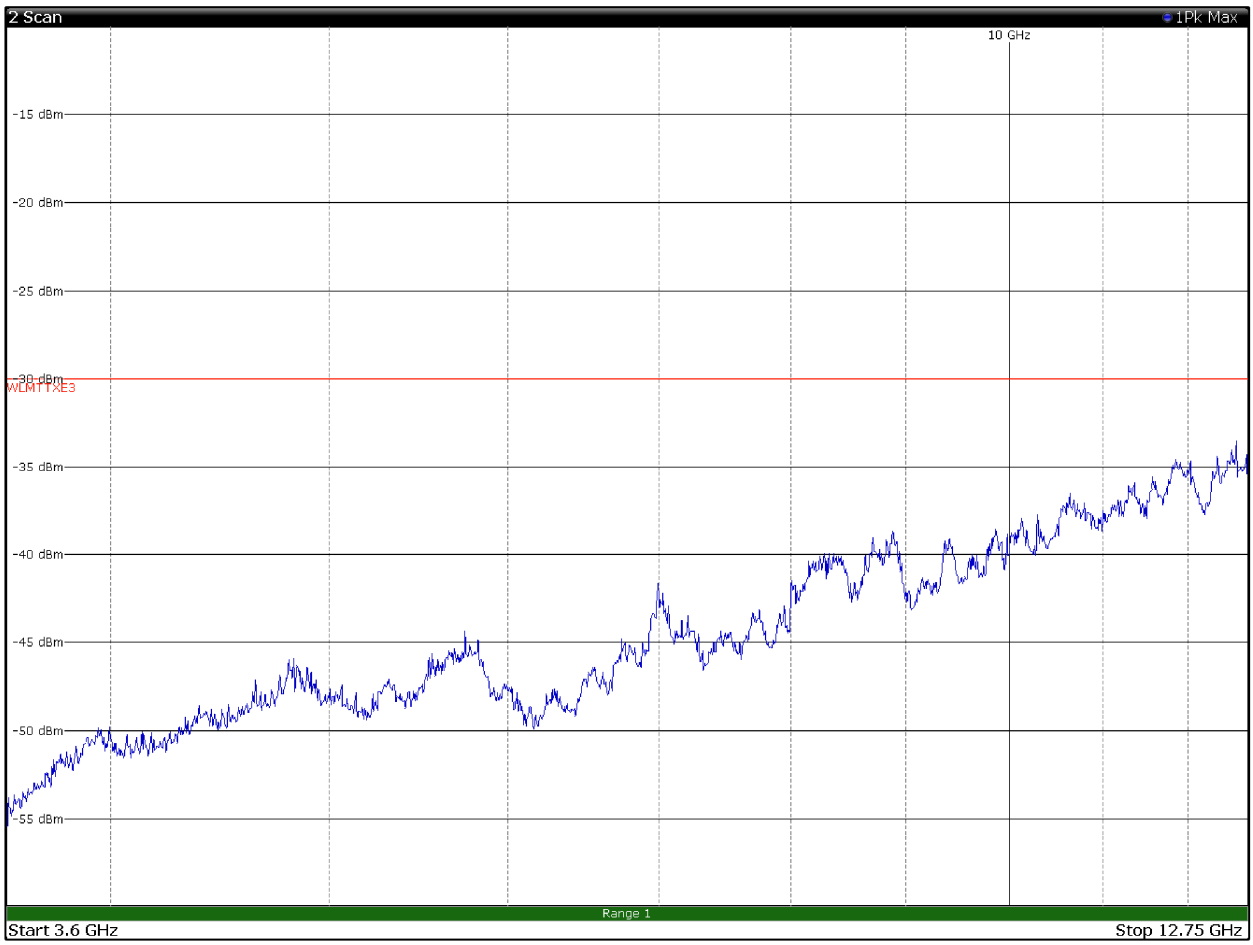
Limit exceeded by the carrier

Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B1
Remarks: Frequency range 1 to 3.6 GHz

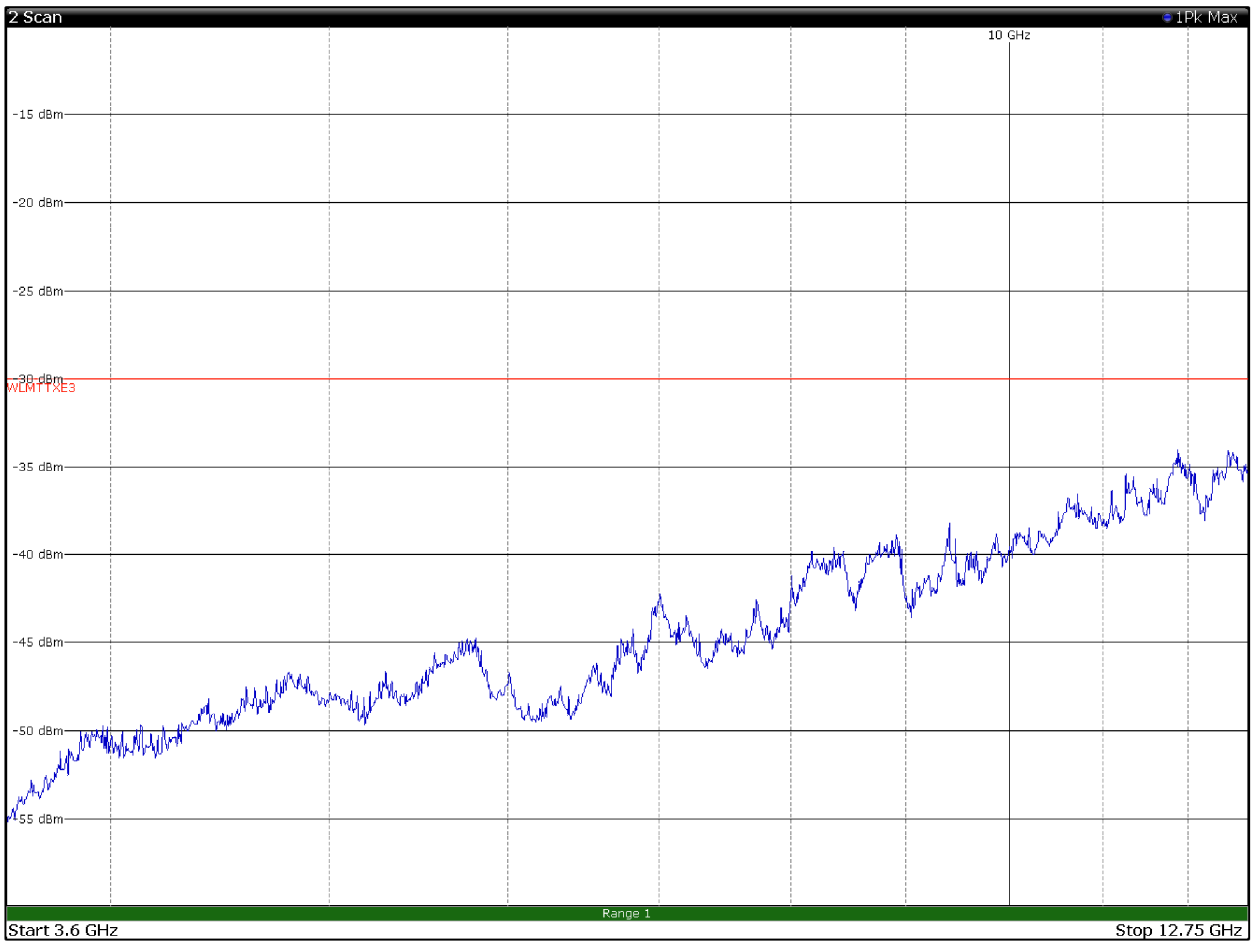


Limit exceeded by the carrier

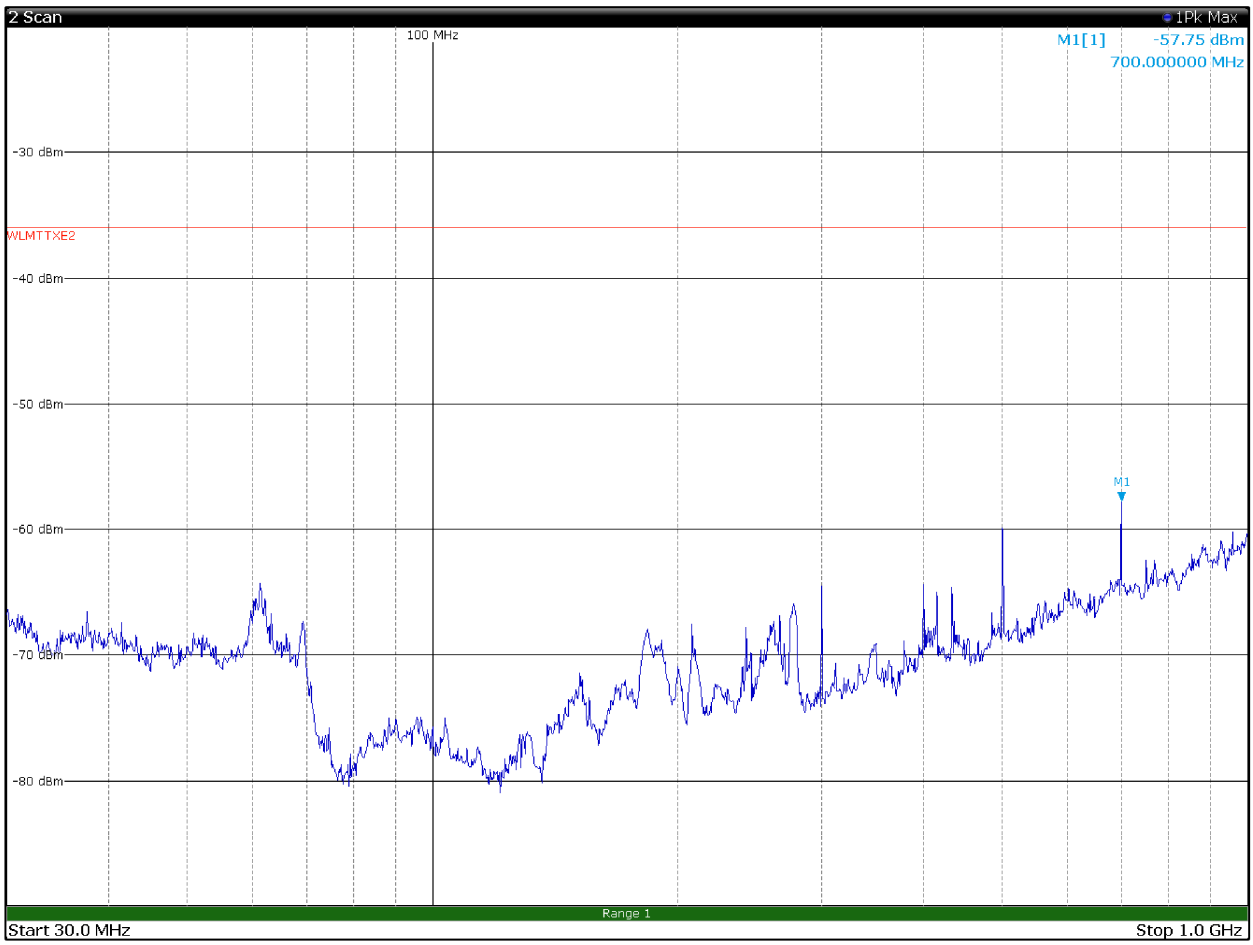
Antenna polarization:	Horizontal	Verdict: Pass
Operation mode:	1	
Configuration mode:	1	
Band:	B1	
Remarks:	Frequency range 3.6 to 12.75 GHz	



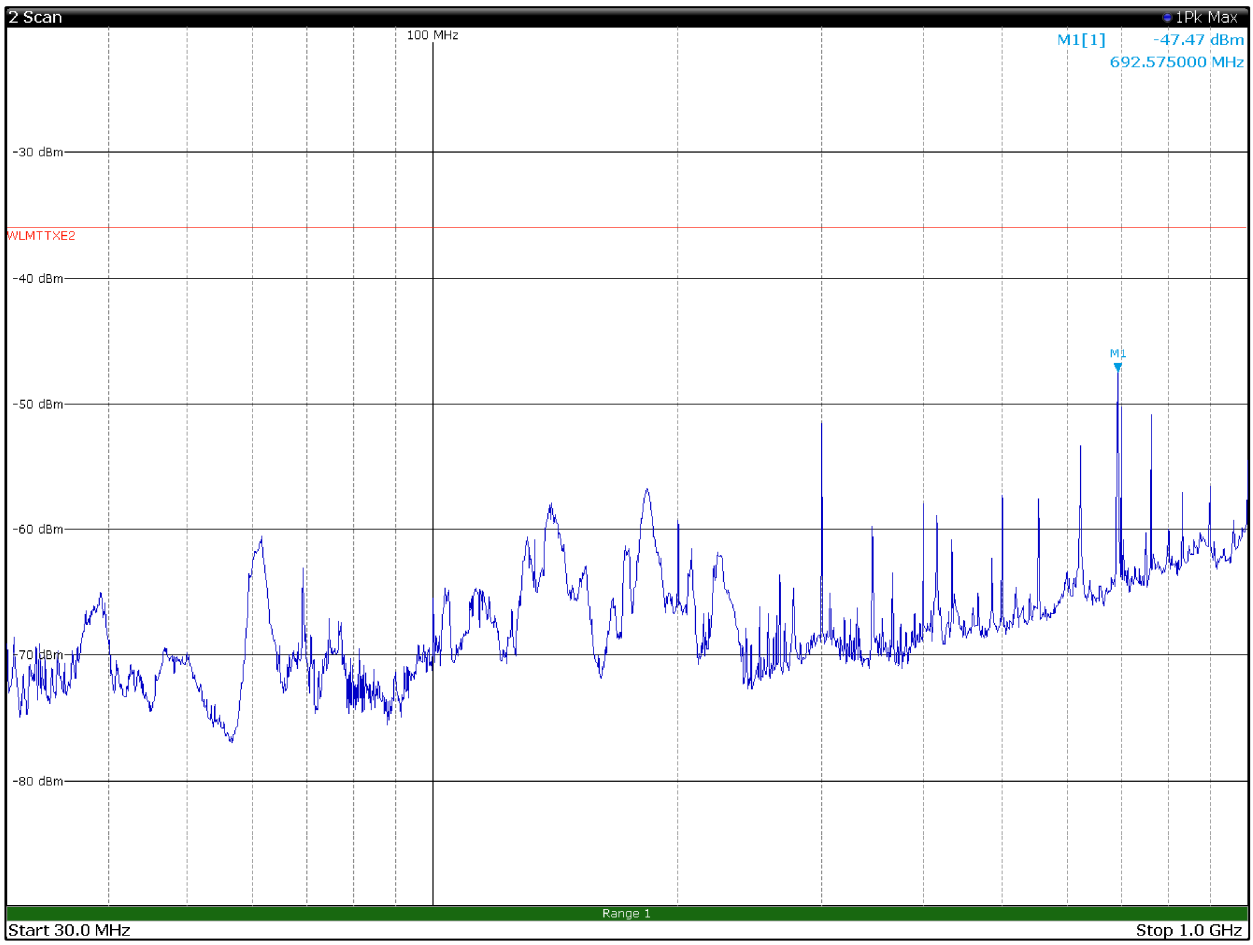
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B1
Remarks: Frequency range 3.6 to 12.75 GHz



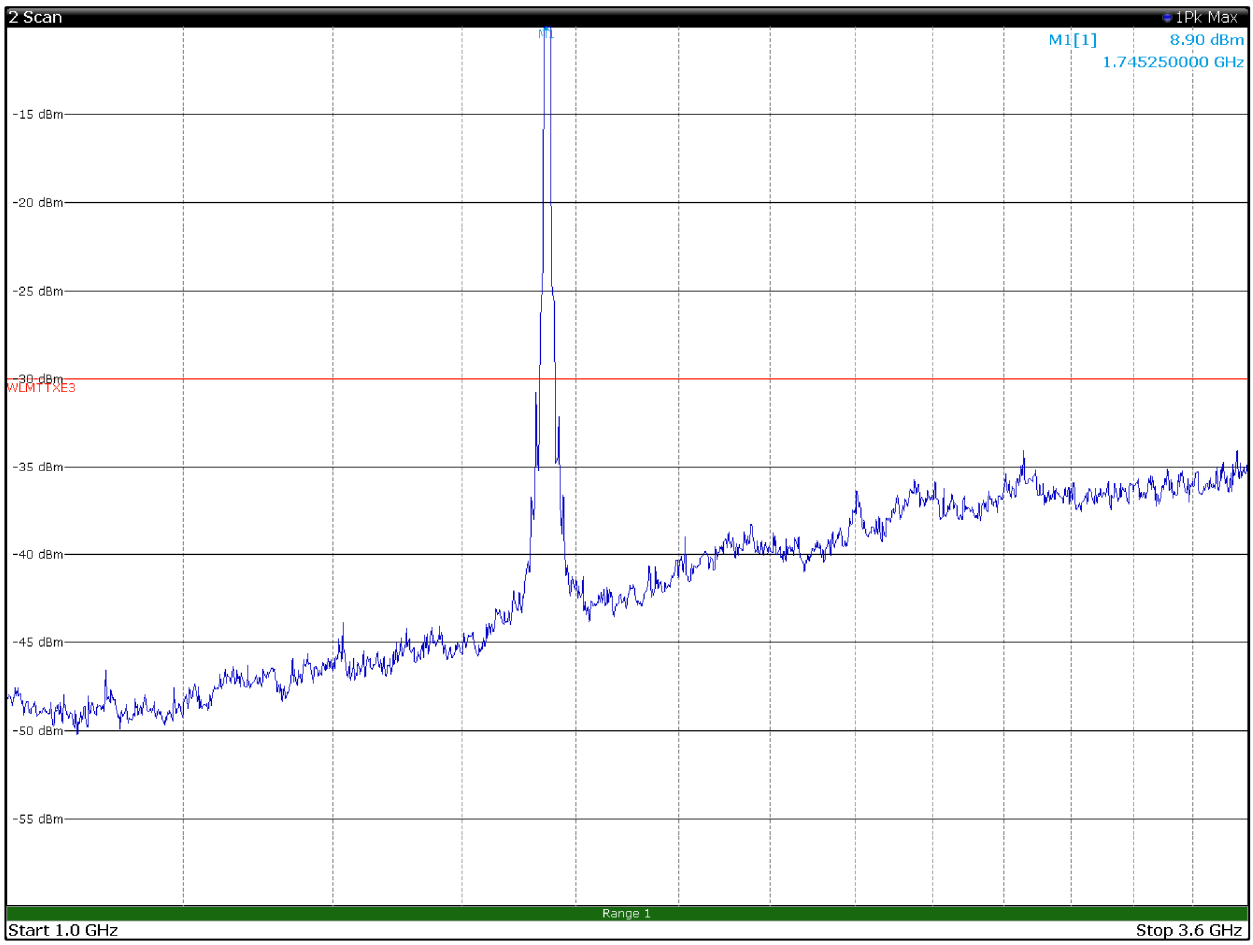
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B3
Remarks: Frequency range 30 to 1000 MHz



Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B3
Remarks: Frequency range 30 to 1000 MHz

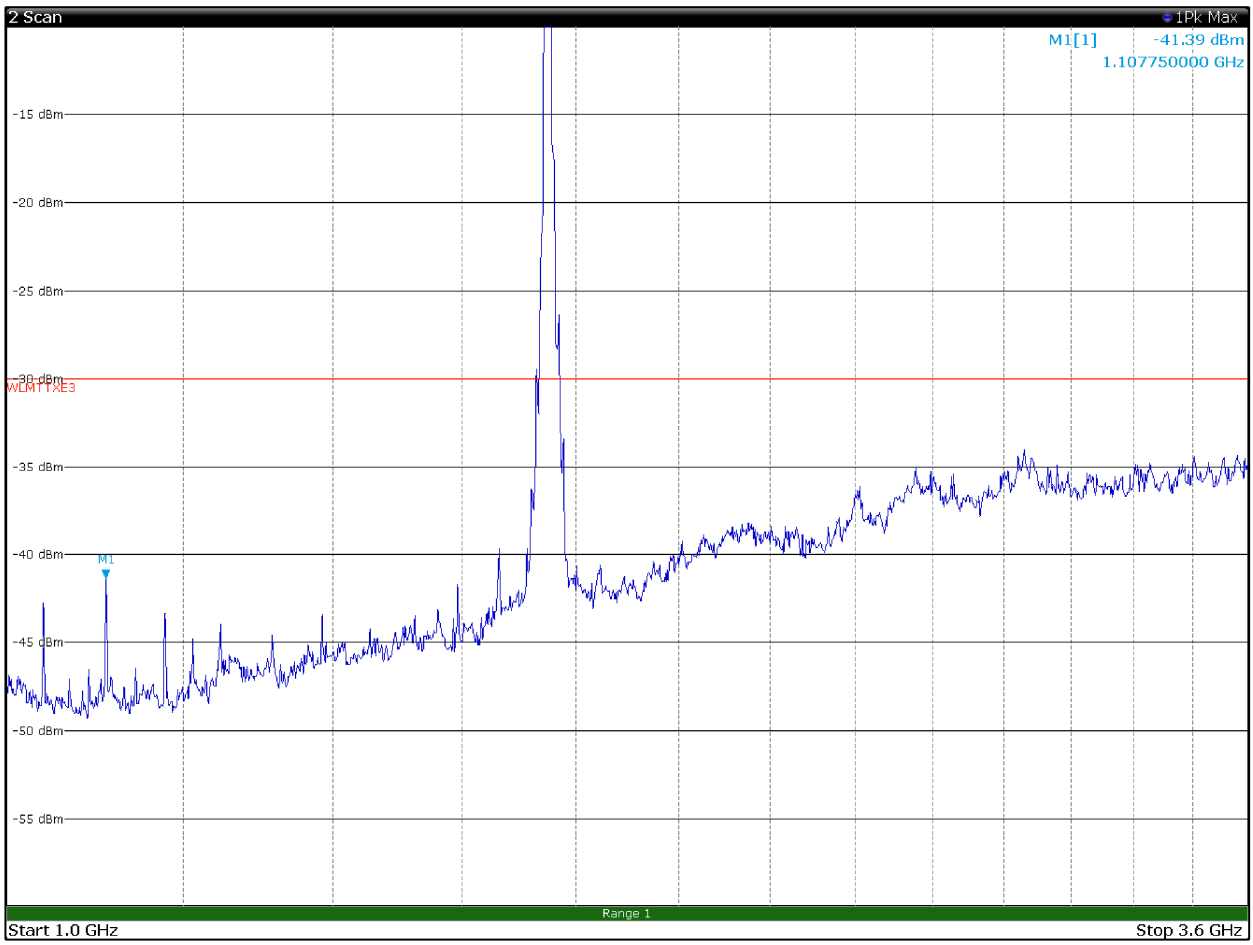


Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B3
Remarks: Frequency range 1 to 3.6 GHz



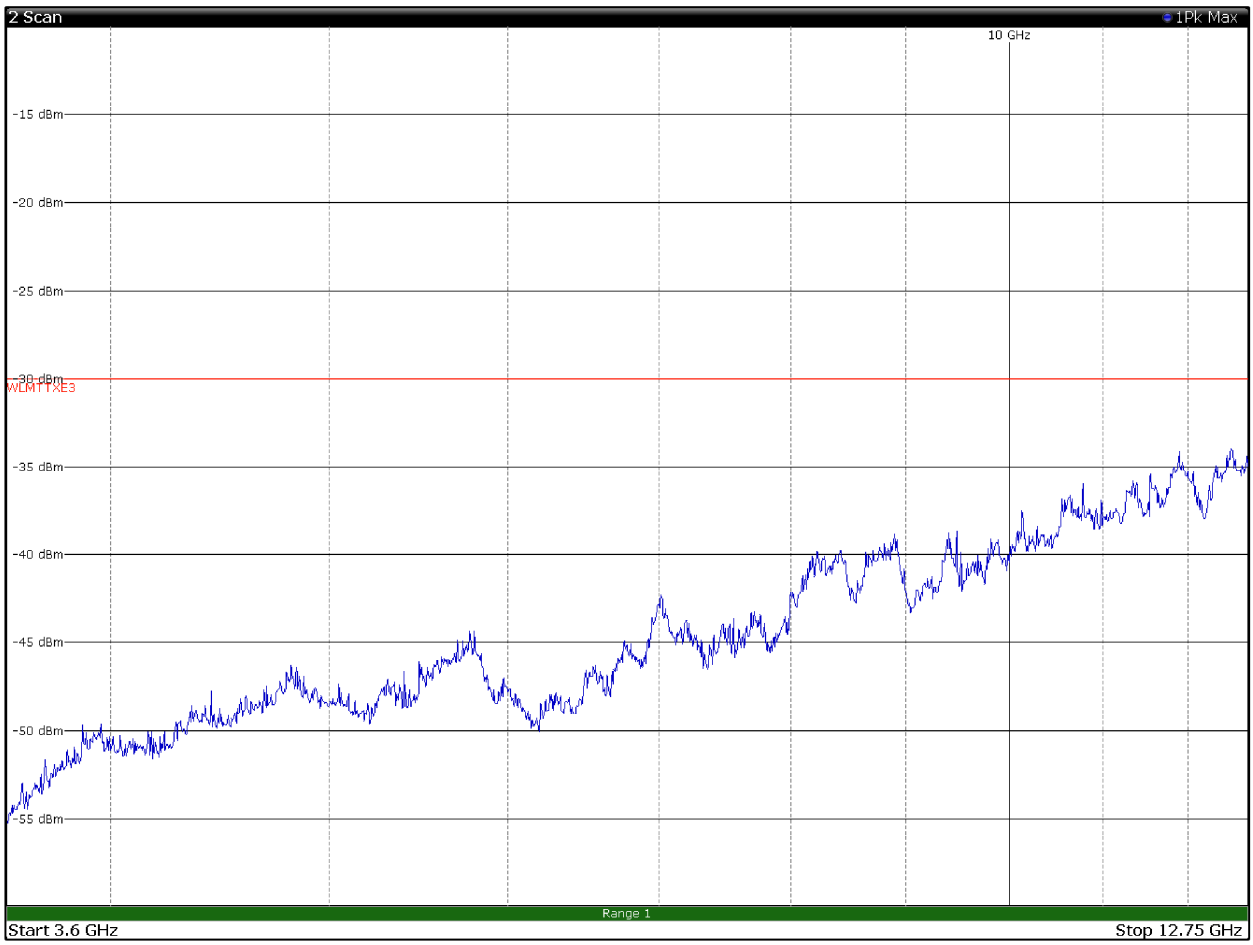
Limit exceeded by the carrier

Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B3
Remarks: Frequency range 1 to 3.6 GHz

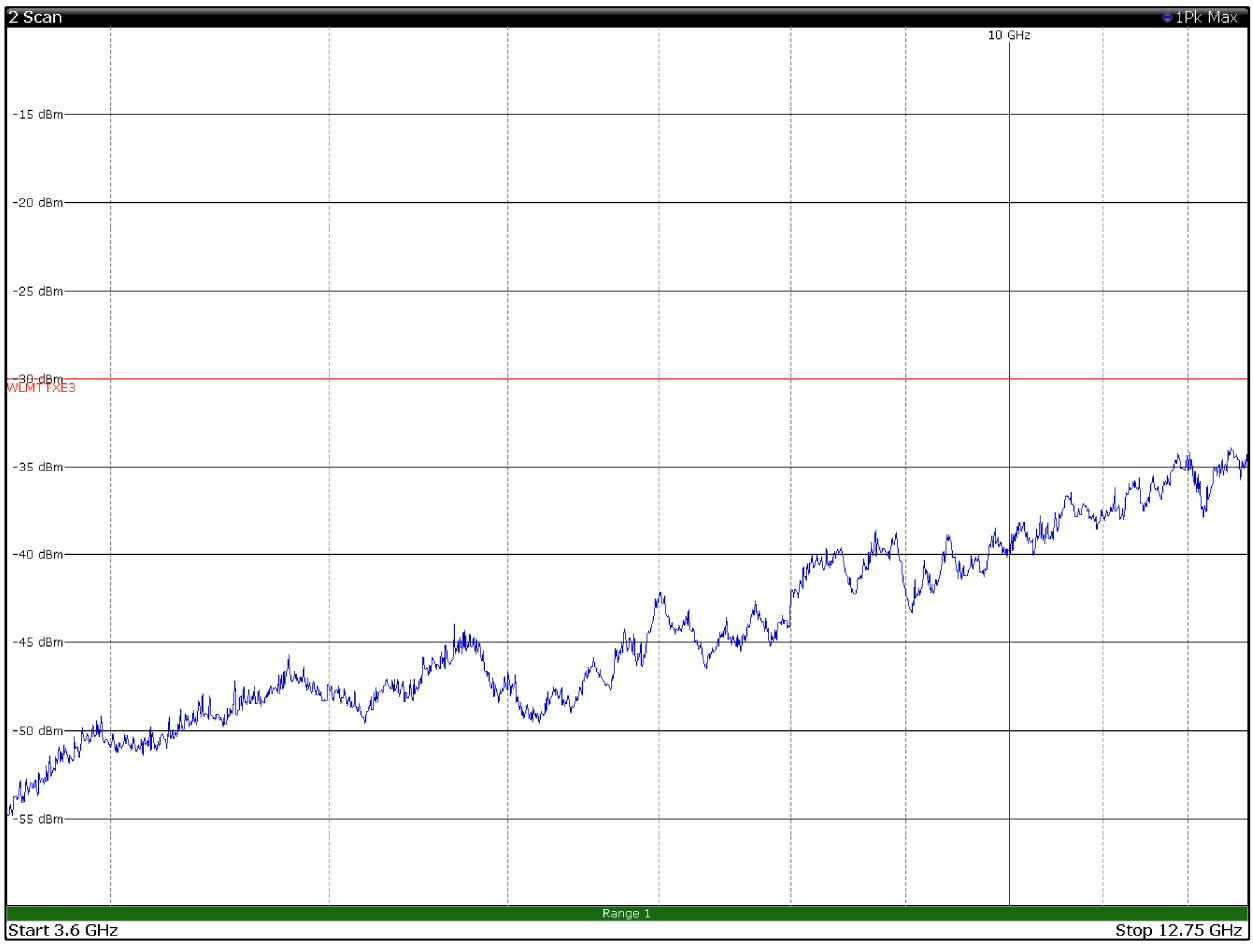


Limit exceeded by the carrier

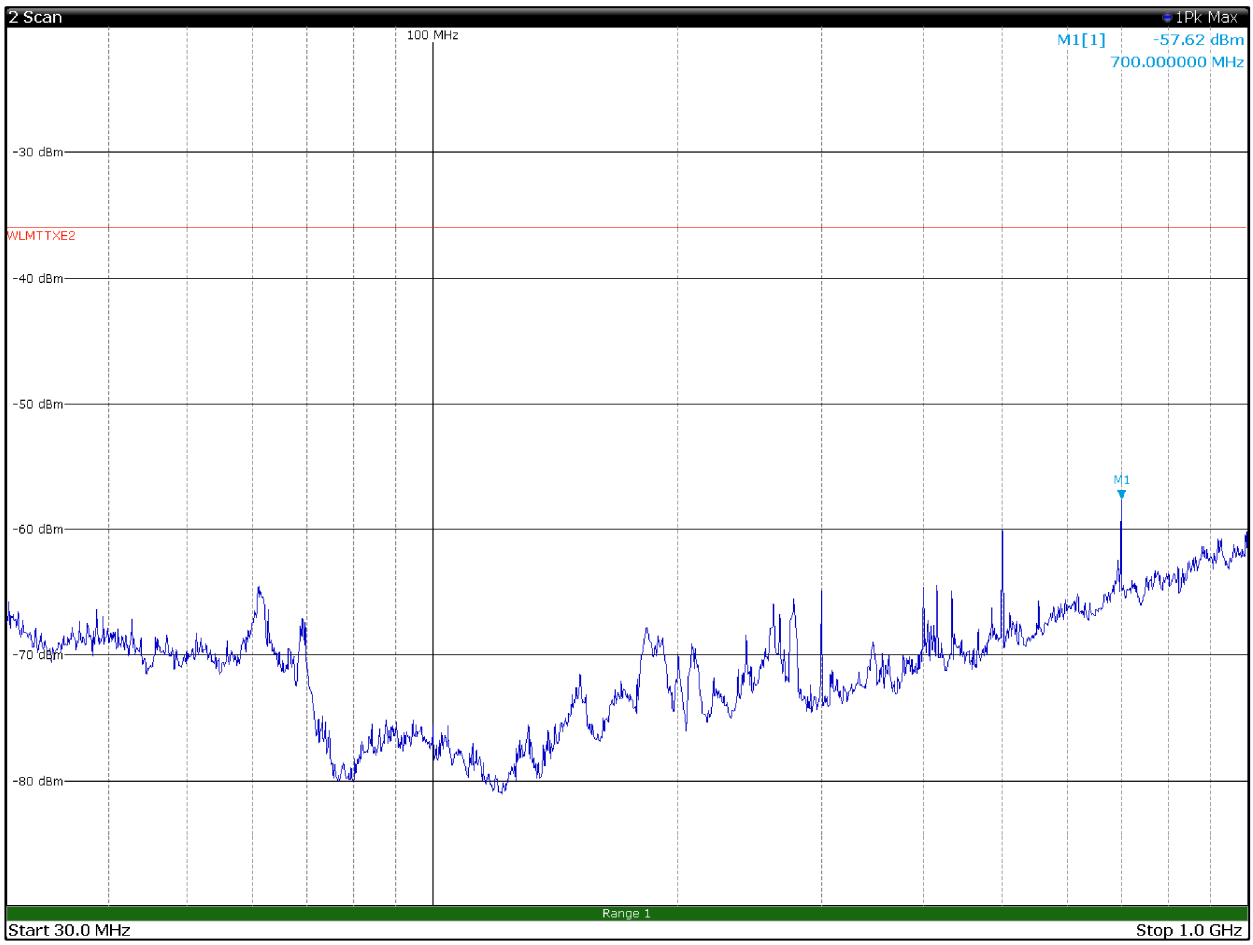
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B3
Remarks: Frequency range 3.6 to 12.75 GHz



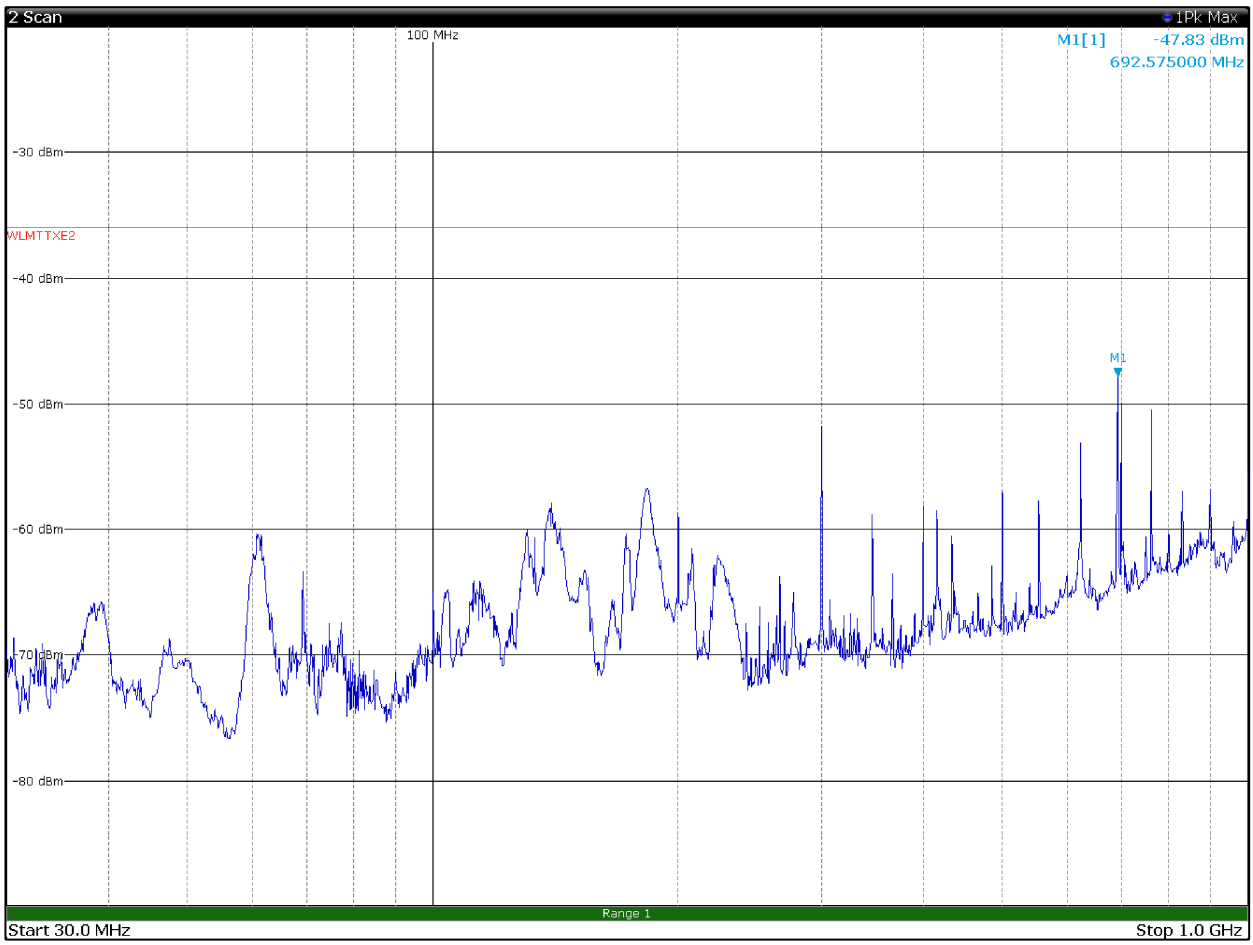
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B3
Remarks: Frequency range 3.6 to 12.75 GHz



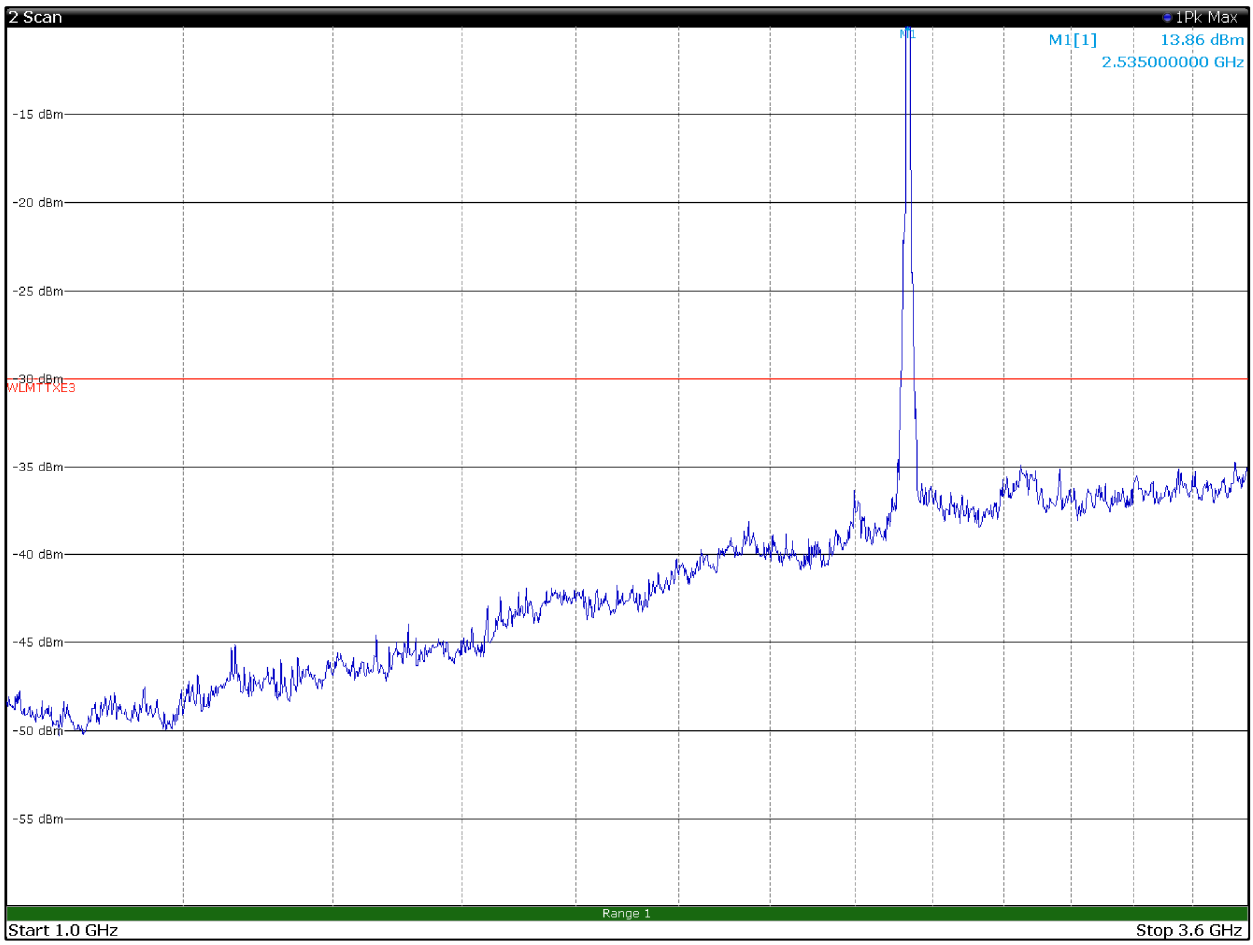
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B7
Remarks: Frequency range 30 to 1000 MHz



Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B7
Remarks: Frequency range 30 to 1000 MHz

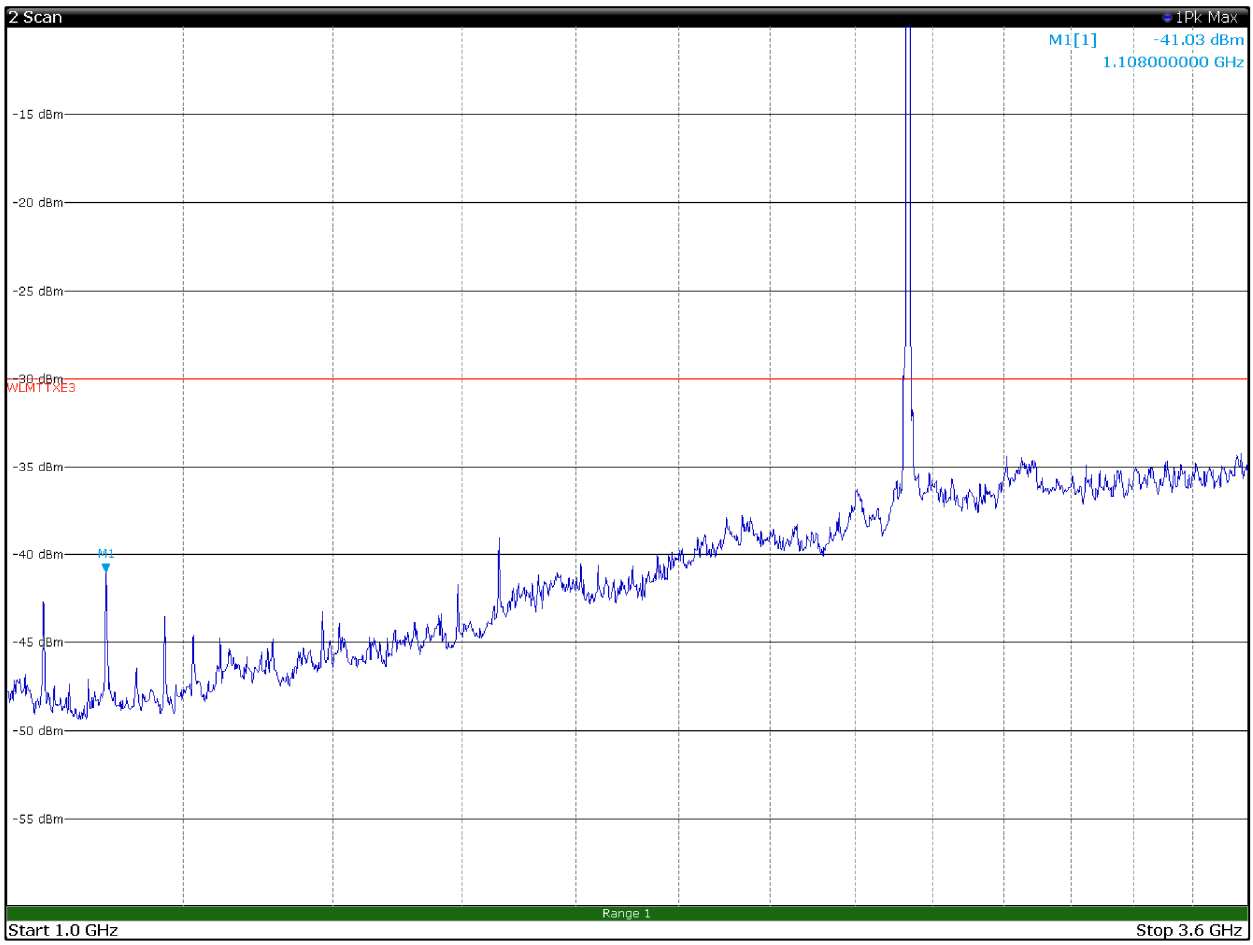


Antenna polarization:	Horizontal	Verdict: Pass
Operation mode:	1	
Configuration mode:	1	
Band:	B7	
Remarks:	Frequency range 1 to 3.6 GHz	



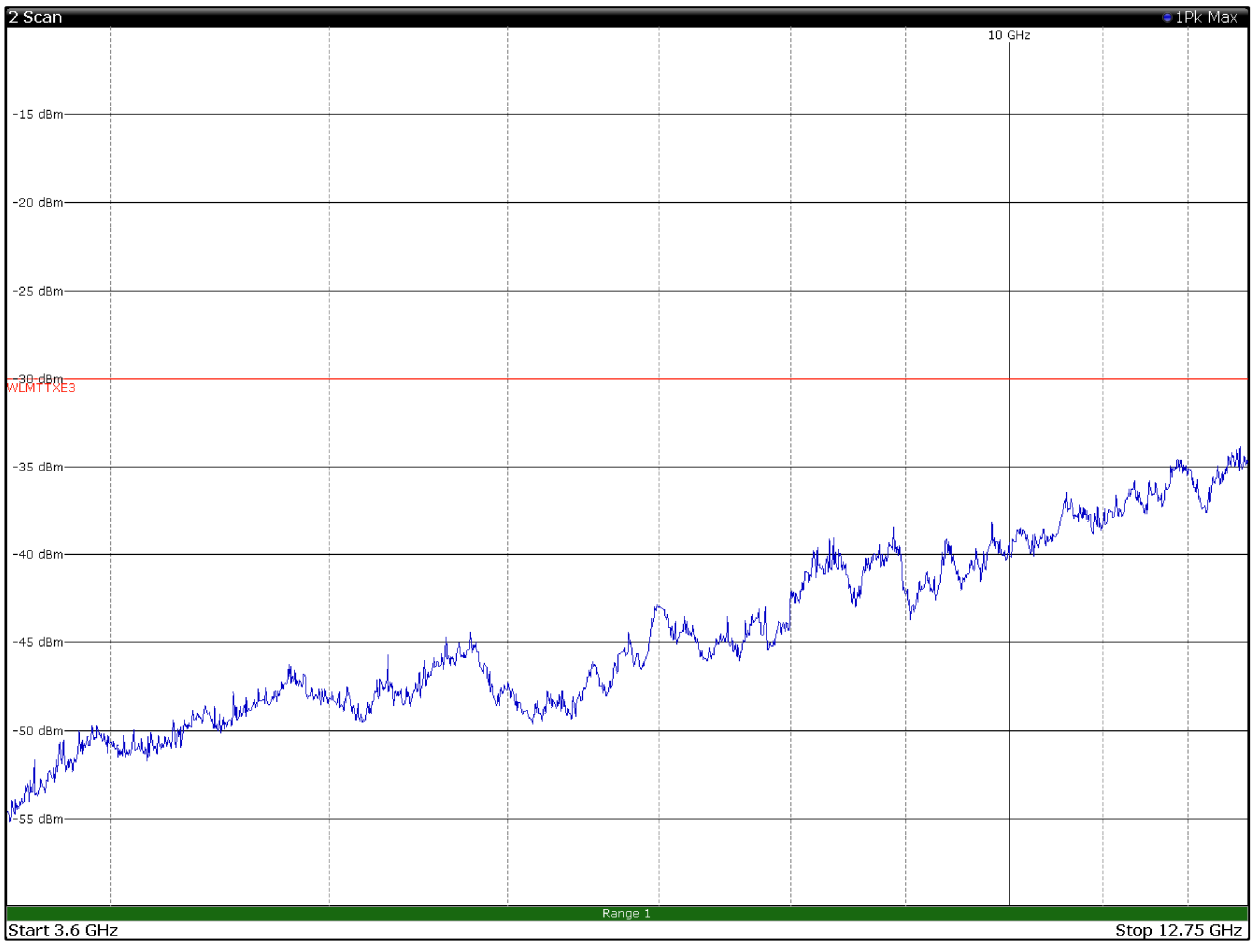
Limit exceeded by the carrier

Antenna polarization:	Vertical	Verdict: Pass
Operation mode:	1	
Configuration mode:	1	
Band:	B7	
Remarks:	Frequency range 1 to 3.6 GHz	

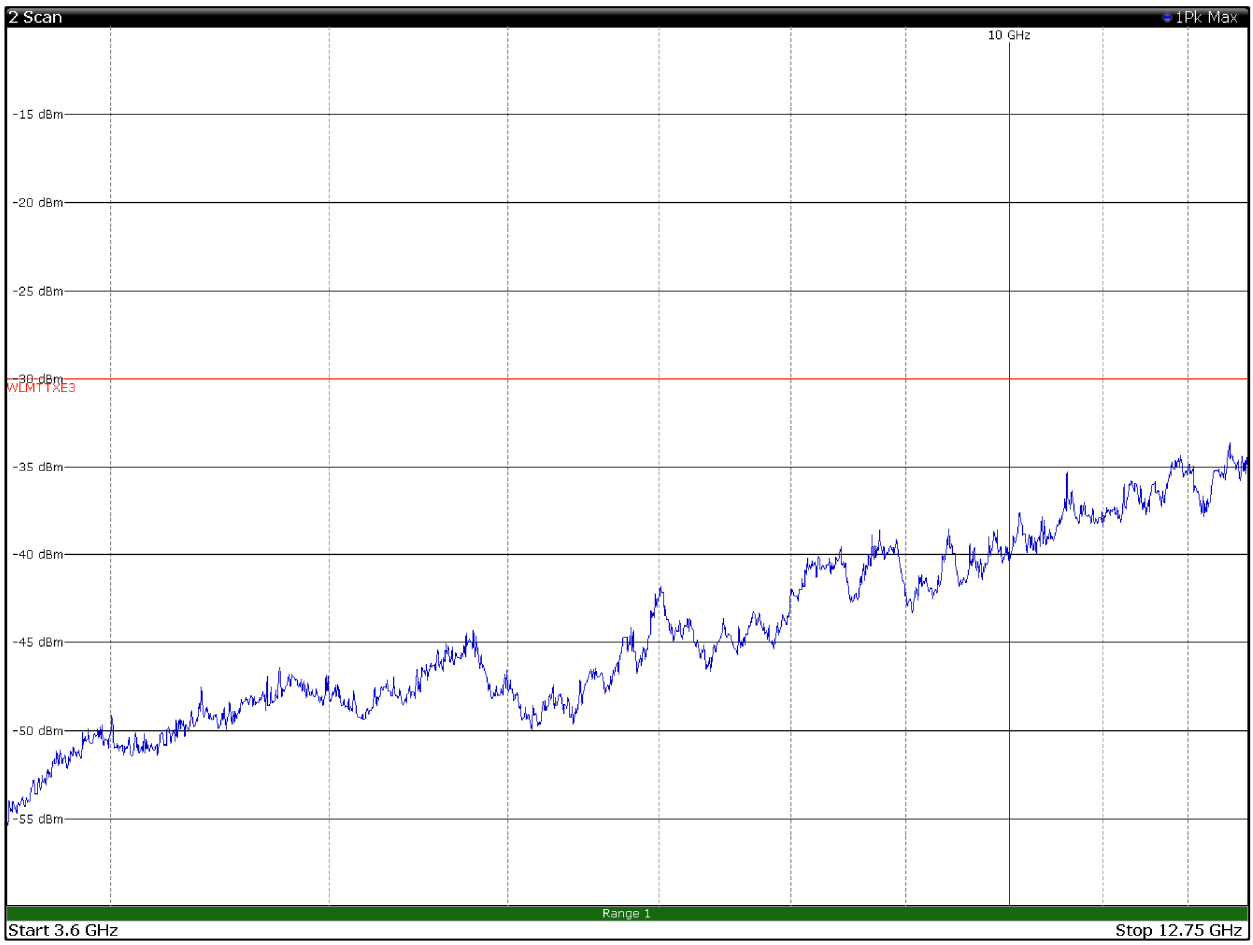


Limit exceeded by the carrier

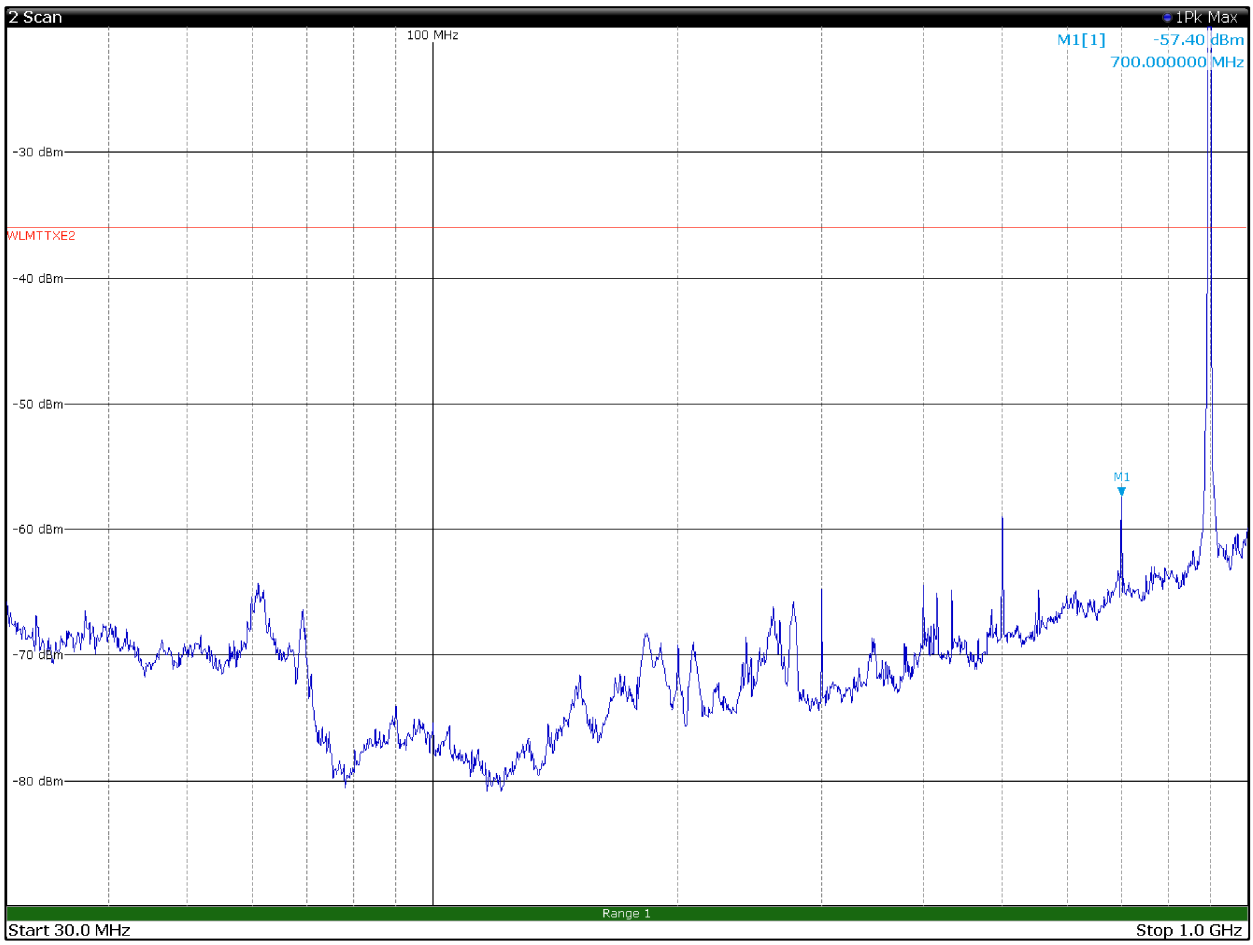
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B7
Remarks: Frequency range 3.6 to 12.75 GHz



Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B7
Remarks: Frequency range 3.6 to 12.75 GHz

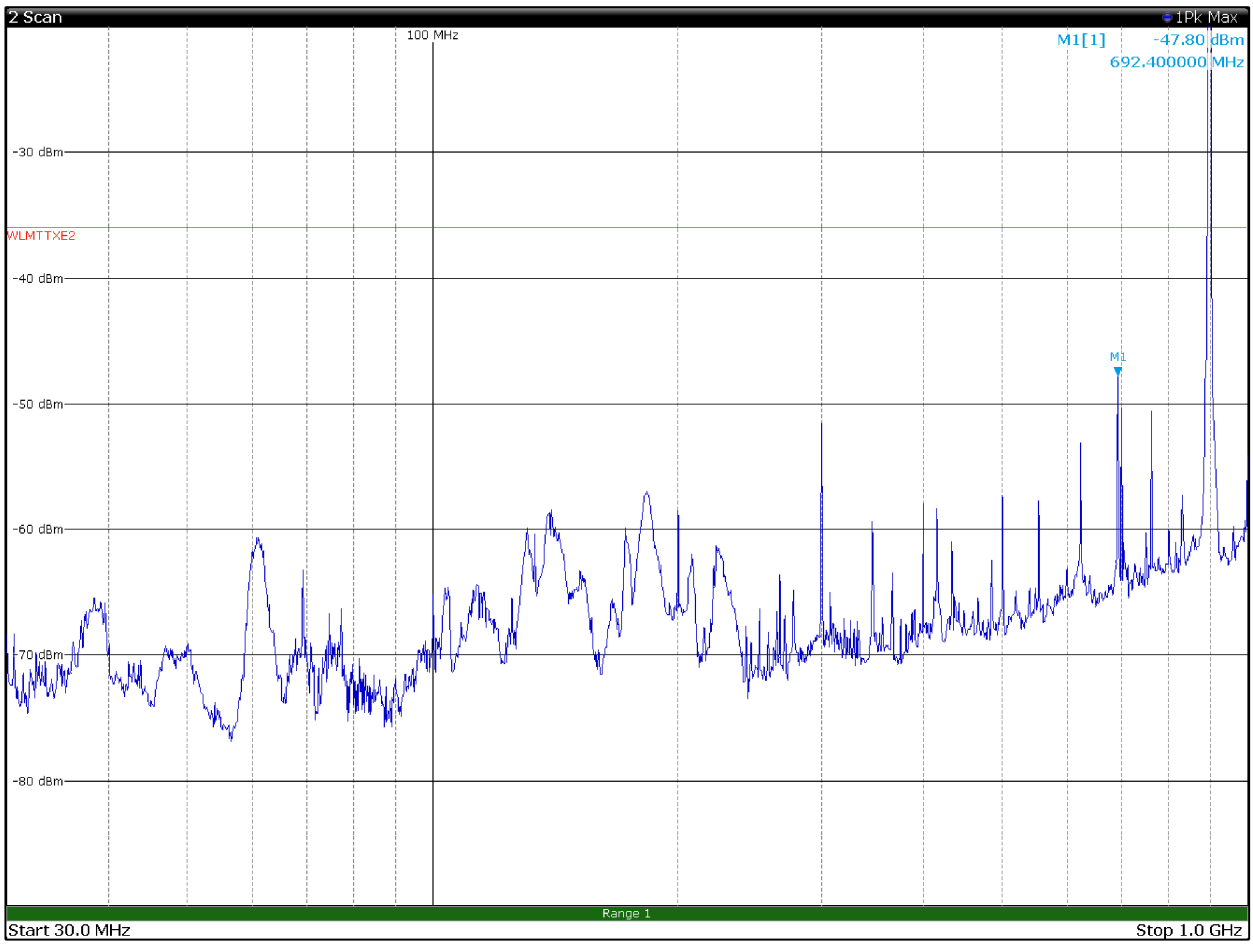


Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B8
Remarks: Frequency range 30 to 1000 MHz



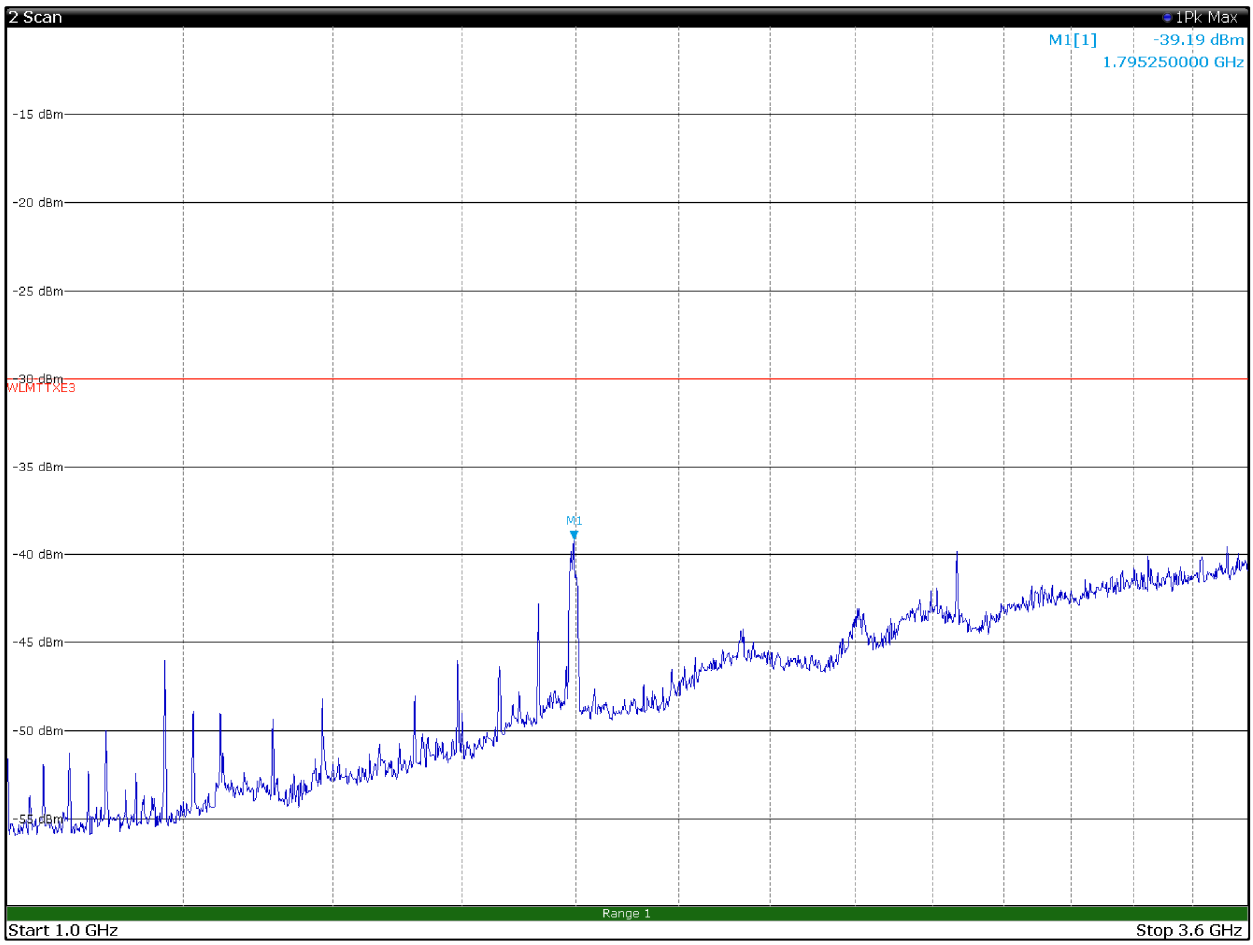
Limit exceeded by the carrier

Antenna polarization:	Vertical	Verdict: Pass
Operation mode:	1	
Configuration mode:	1	
Band:	B8	
Remarks:	Frequency range 30 to 1000 MHz	

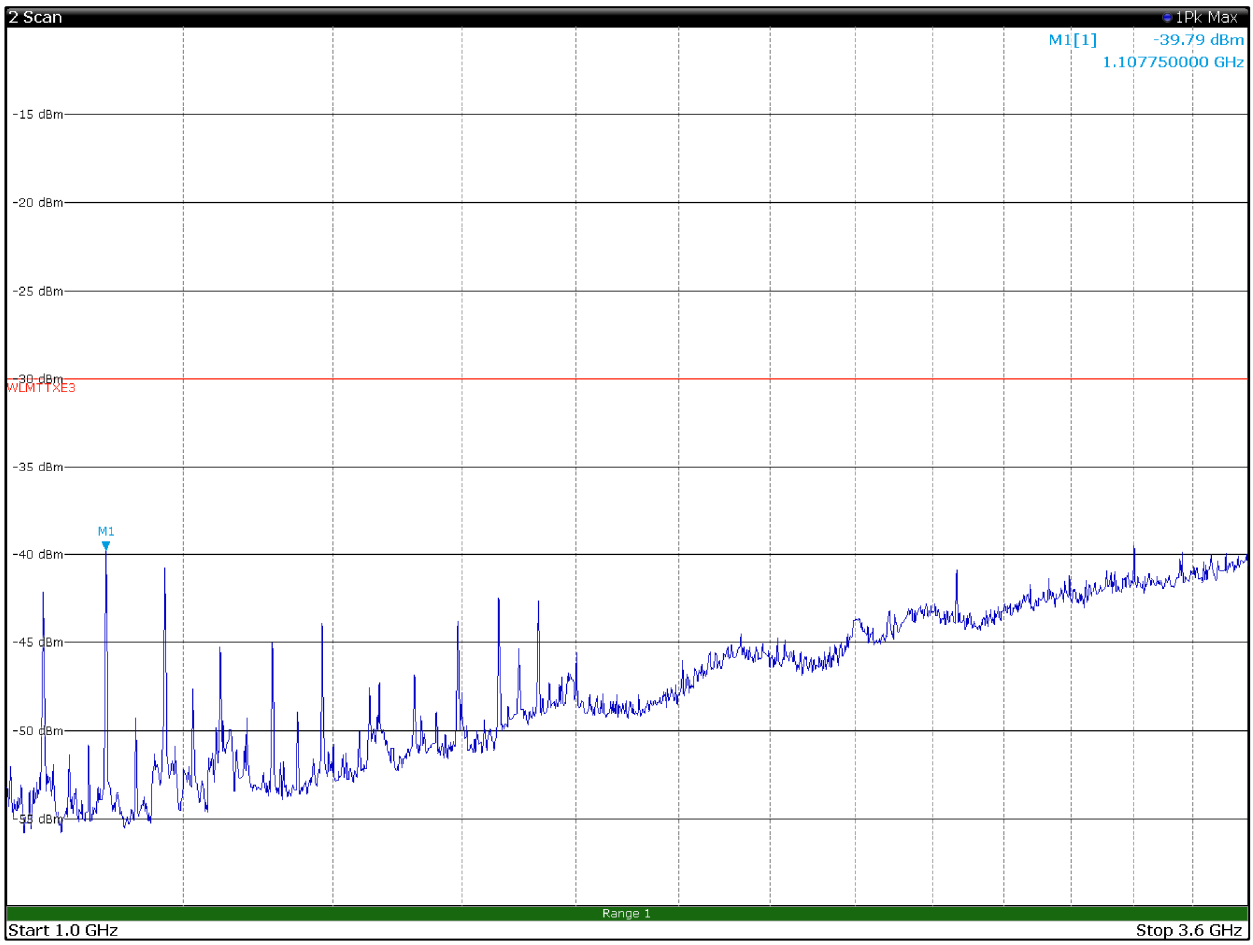


Limit exceeded by the carrier

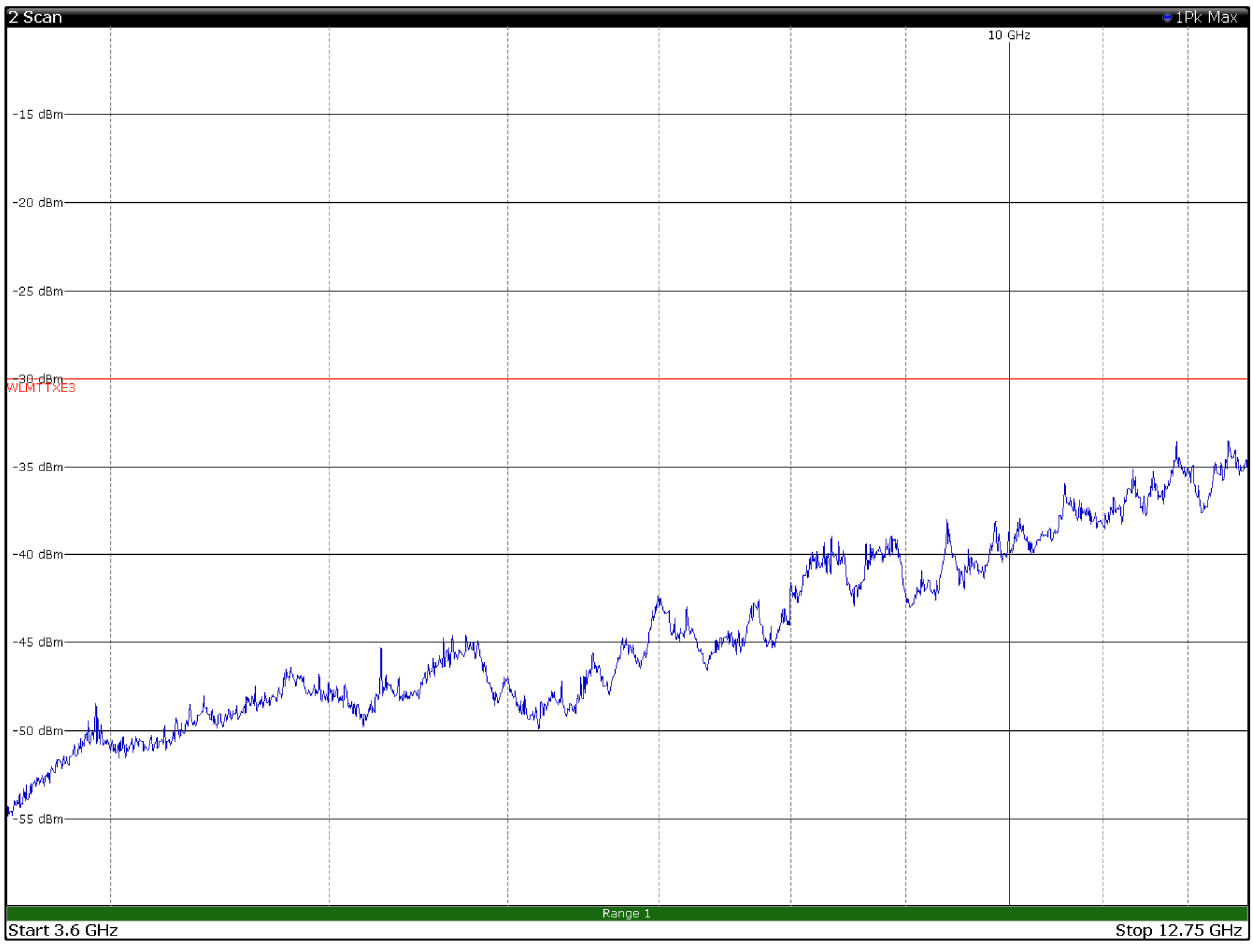
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B8
Remarks: Frequency range 1 to 3.6 GHz



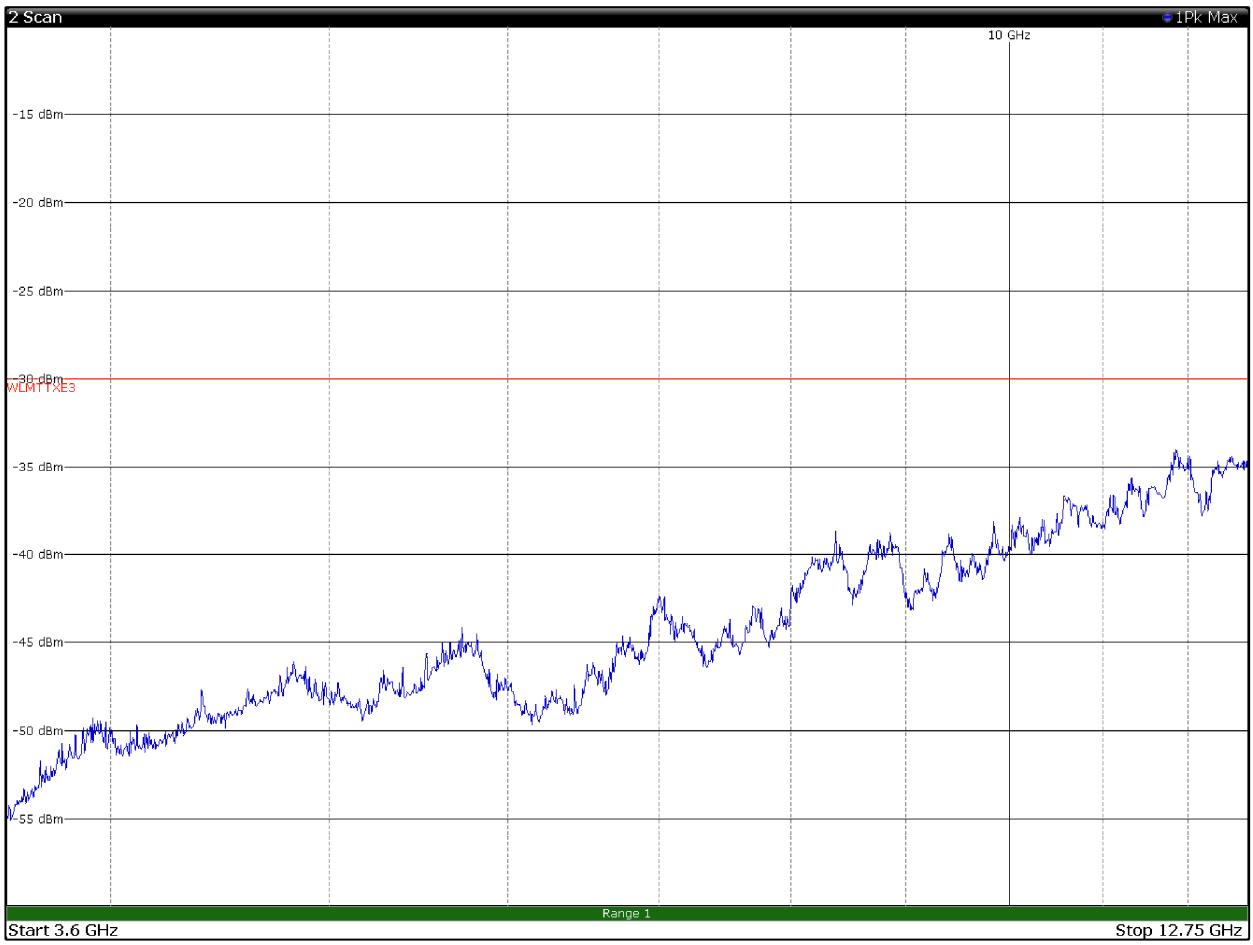
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B8
Remarks: Frequency range 1 to 3.6 GHz



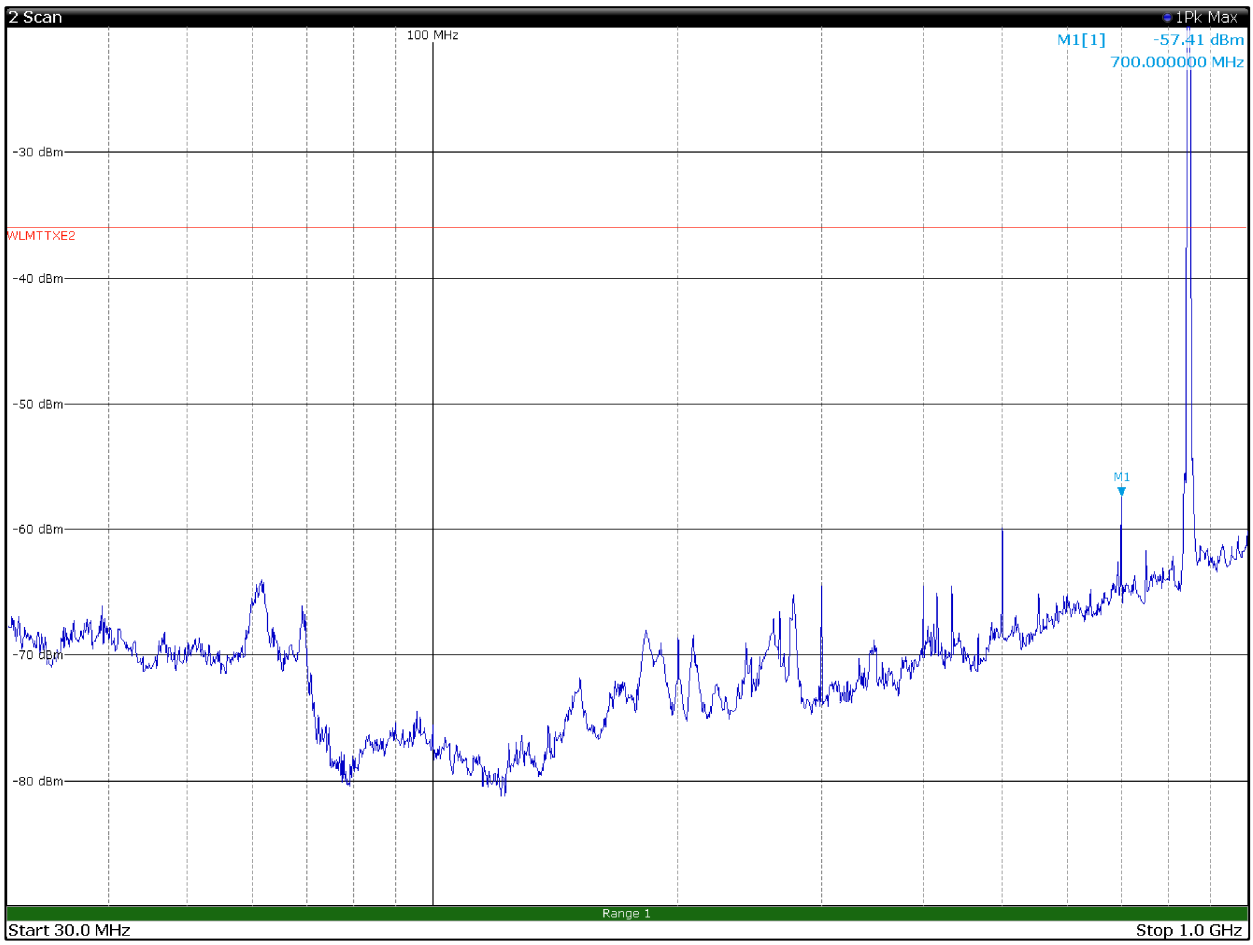
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B8
Remarks: Frequency range 3.6 to 12.75 GHz



Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B8
Remarks: Frequency range 3.6 to 12.75 GHz

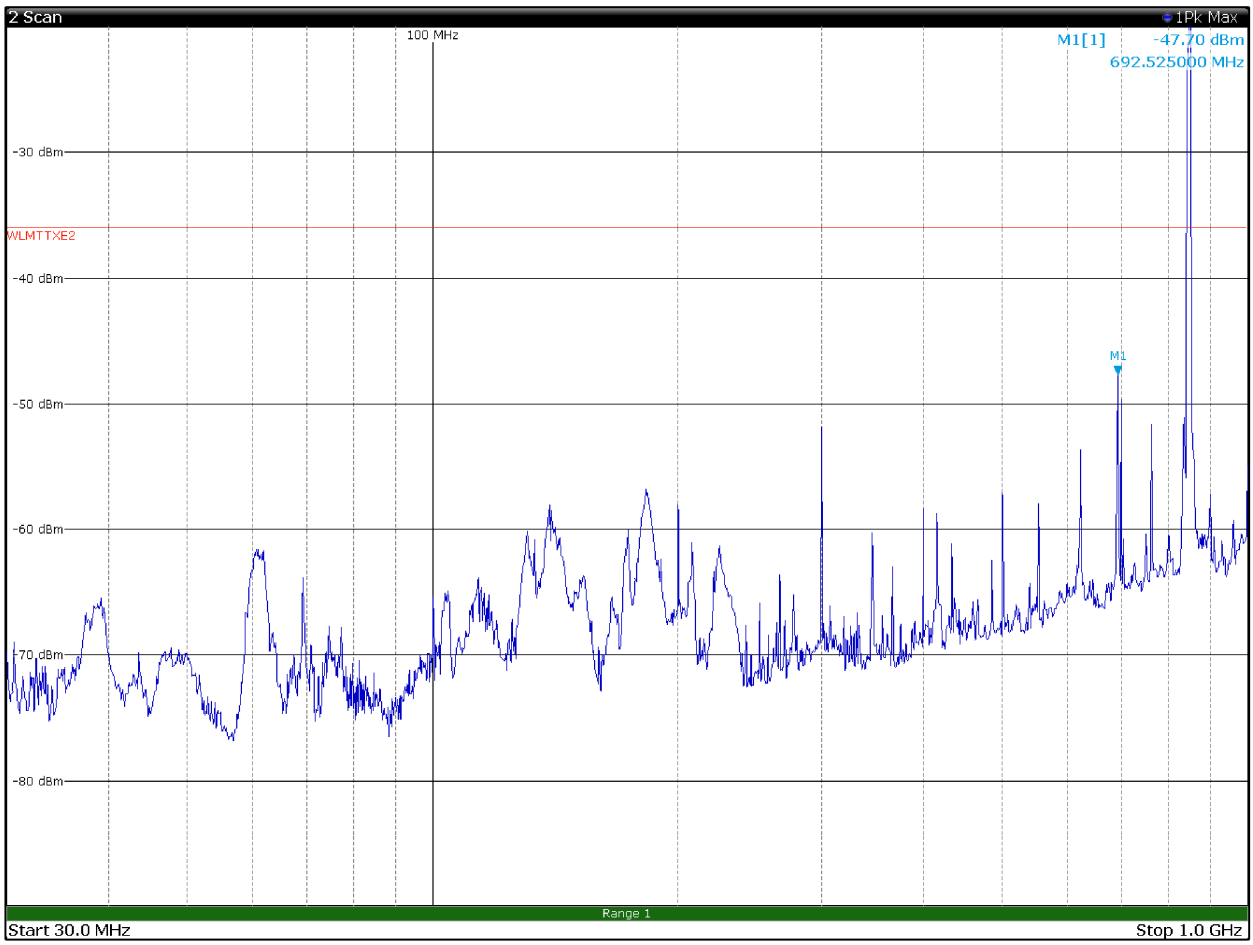


Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B20
Remarks: Frequency range 30 to 1000 MHz



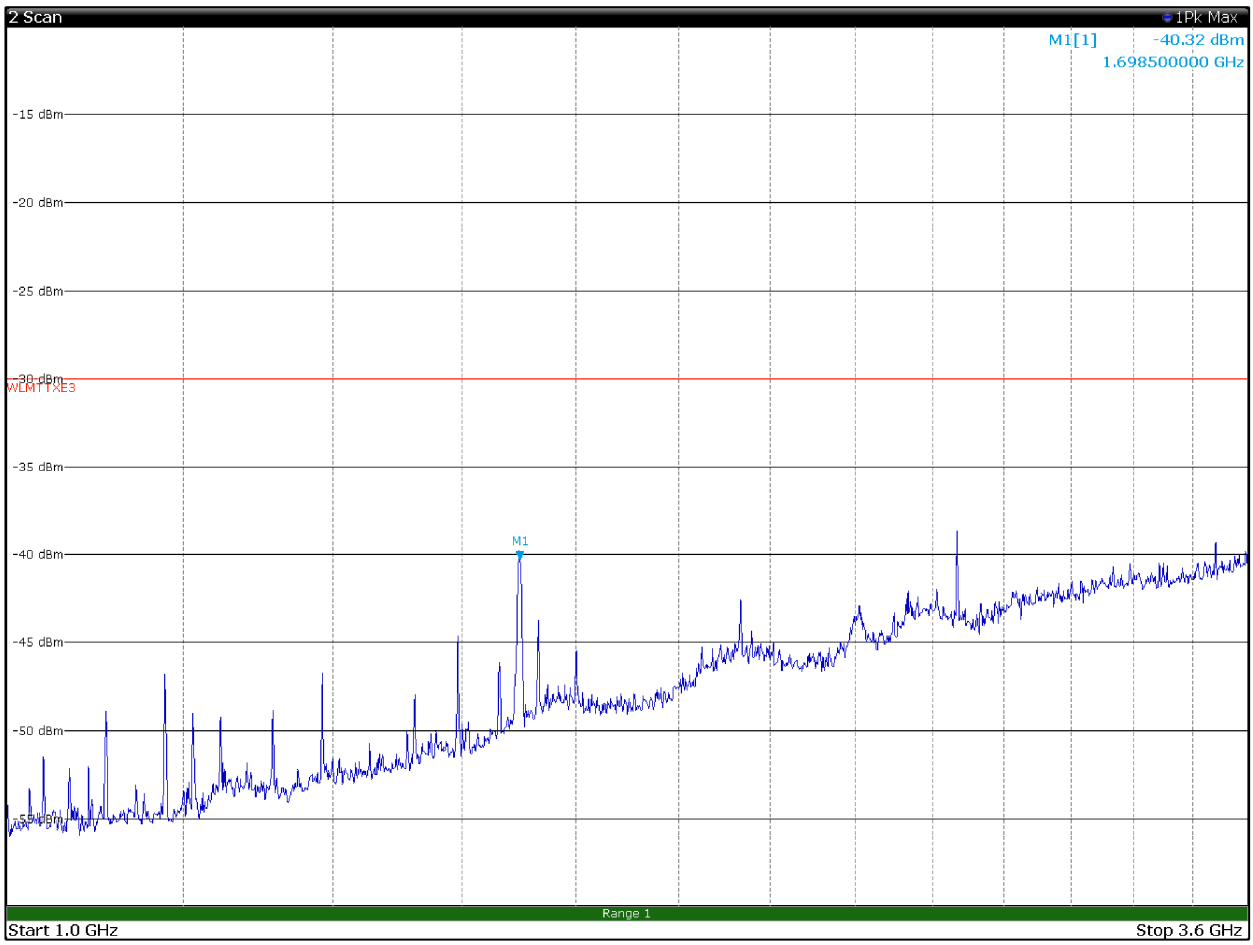
Limit exceeded by the carrier

Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B20
Remarks: Frequency range 30 to 1000 MHz

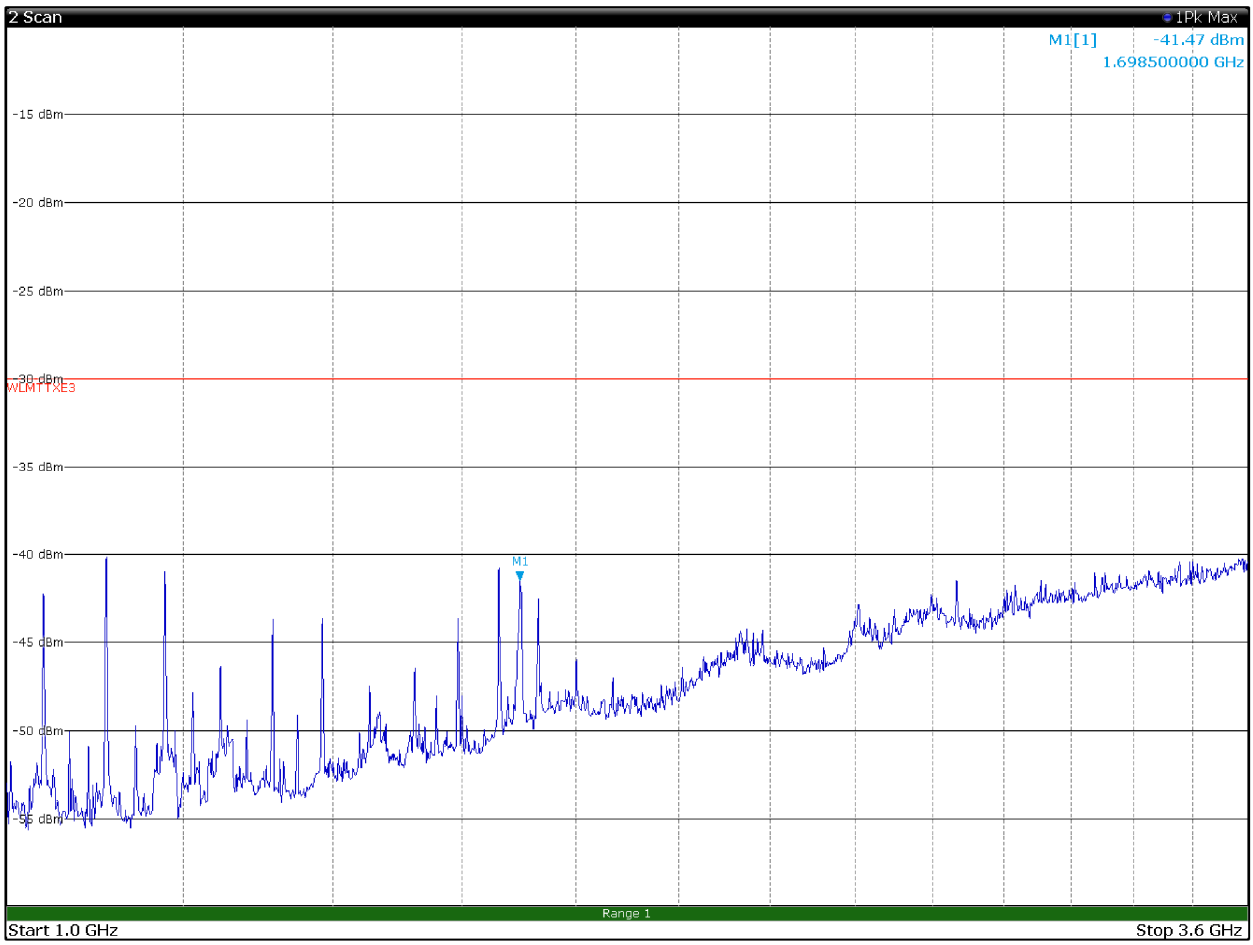


Limit exceeded by the carrier

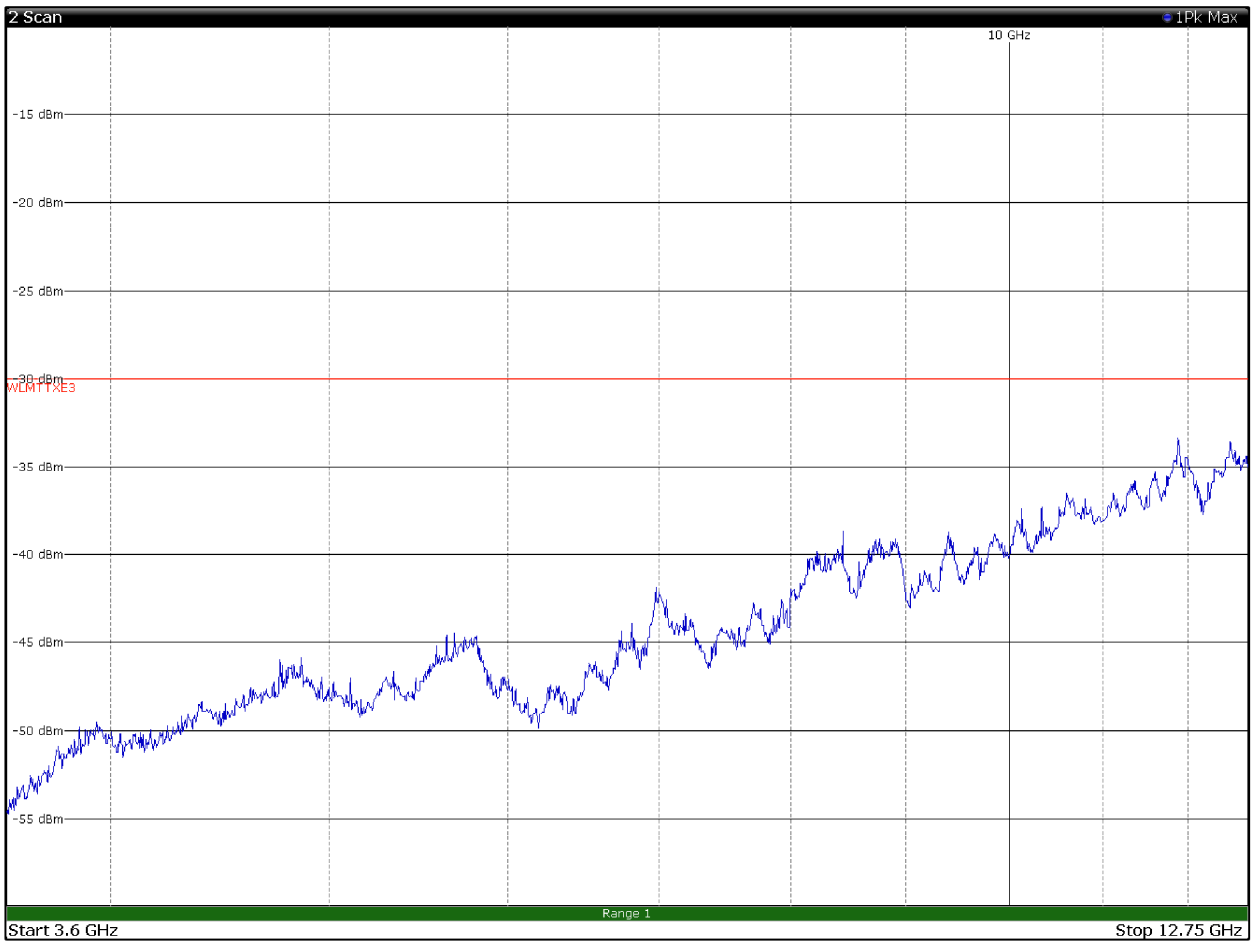
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B20
Remarks: Frequency range 1 to 3.6 GHz



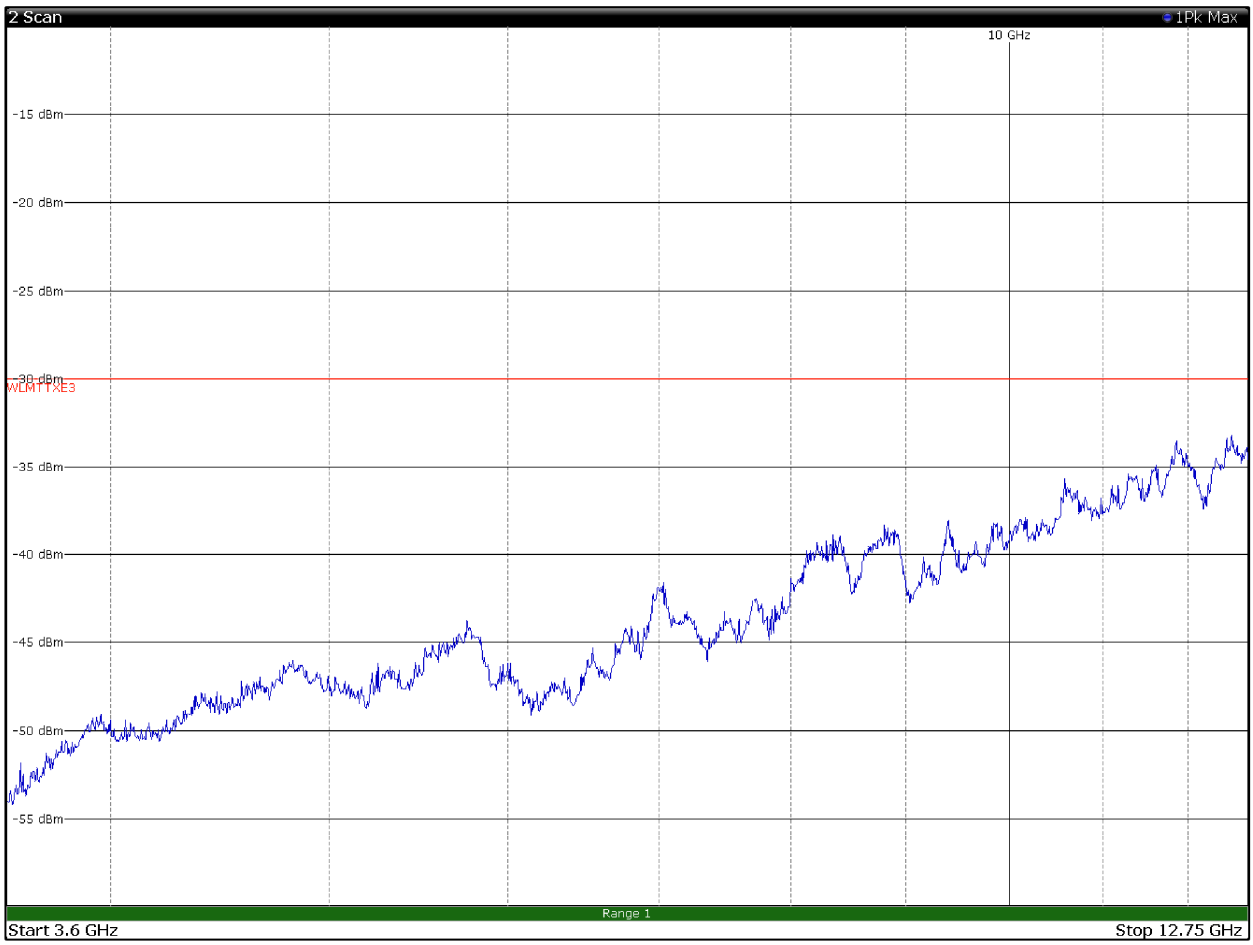
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B20
Remarks: Frequency range 1 to 3.6 GHz



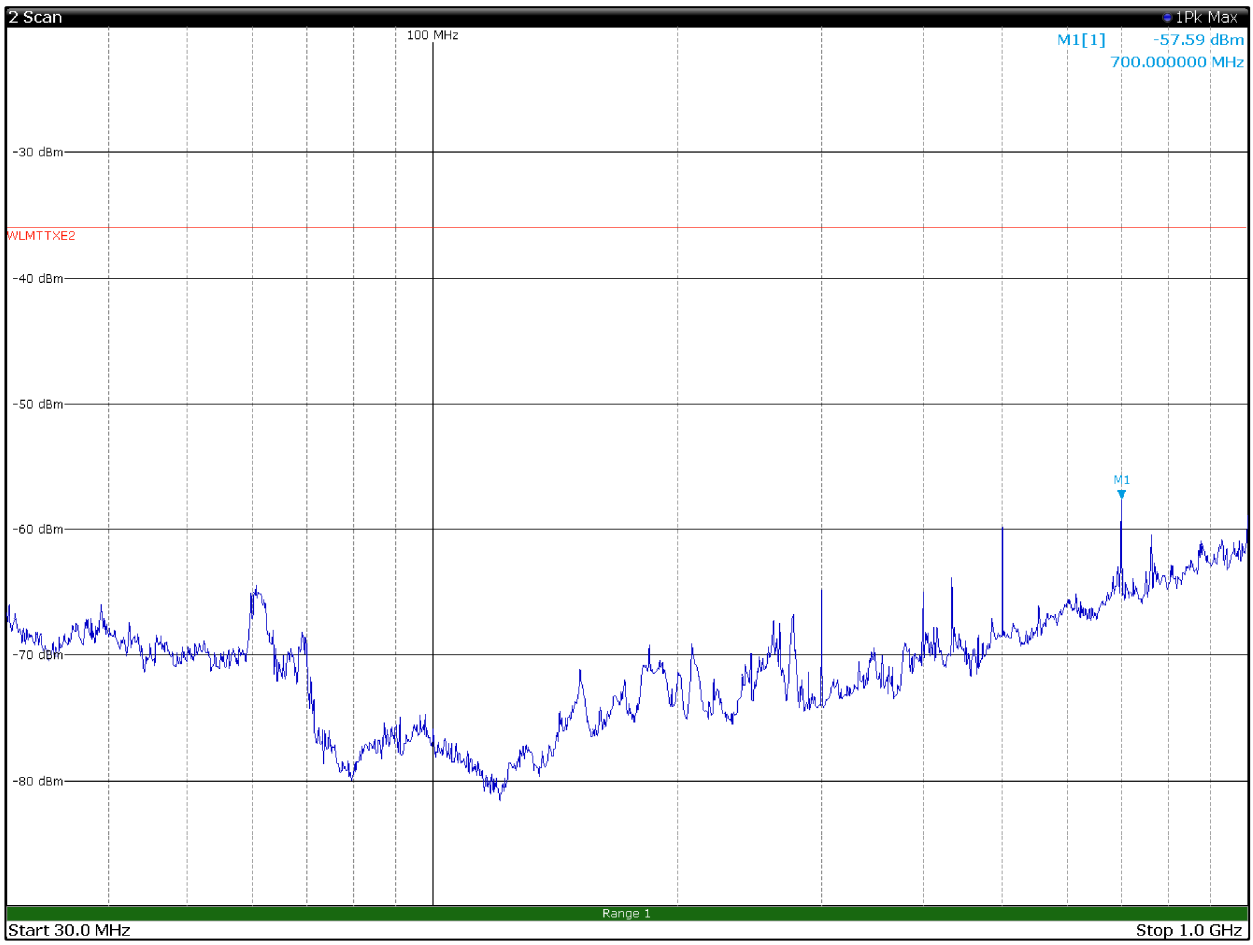
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B20
Remarks: Frequency range 3.6 to 12.75 GHz



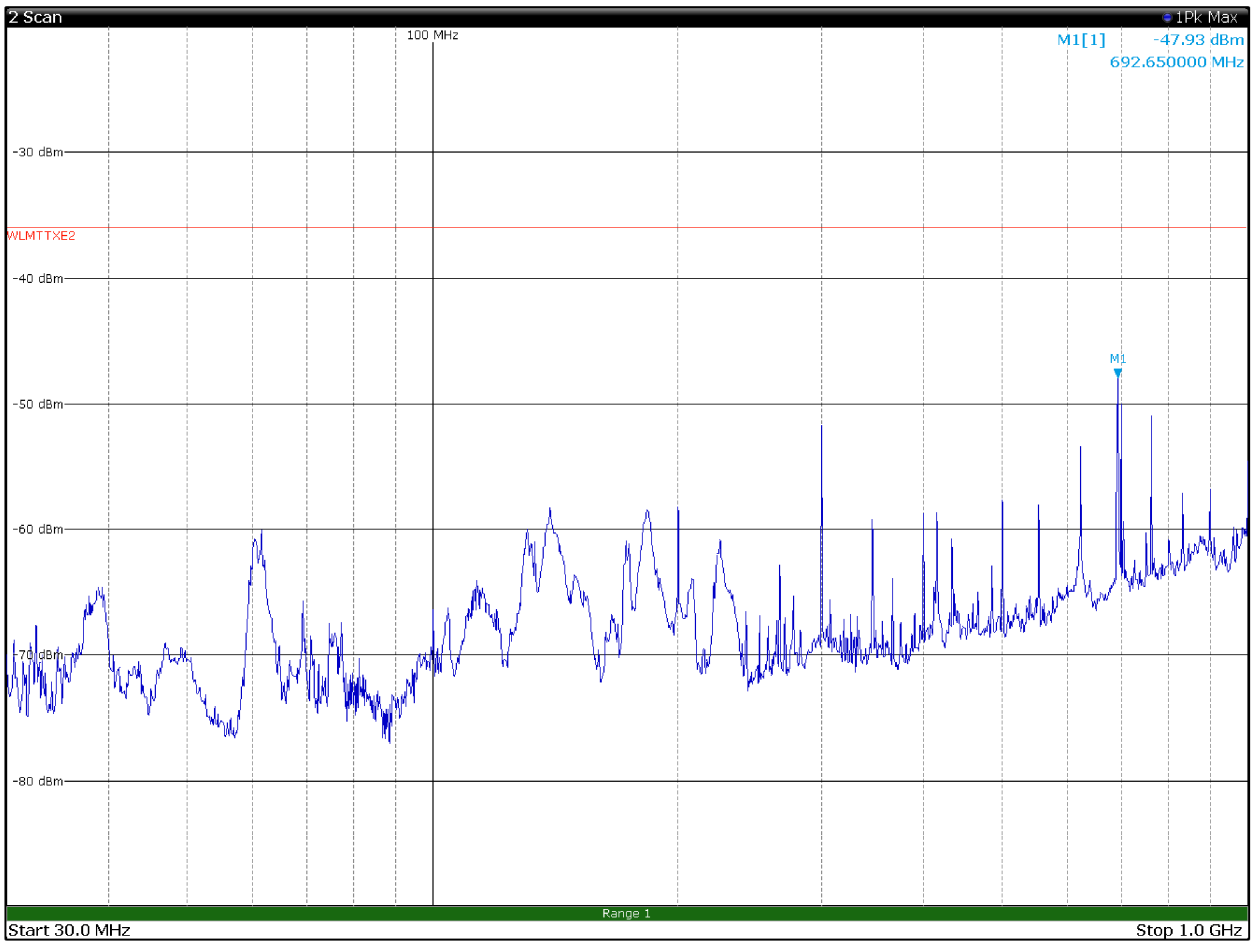
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B20
Remarks: Frequency range 3.6 to 12.75 GHz



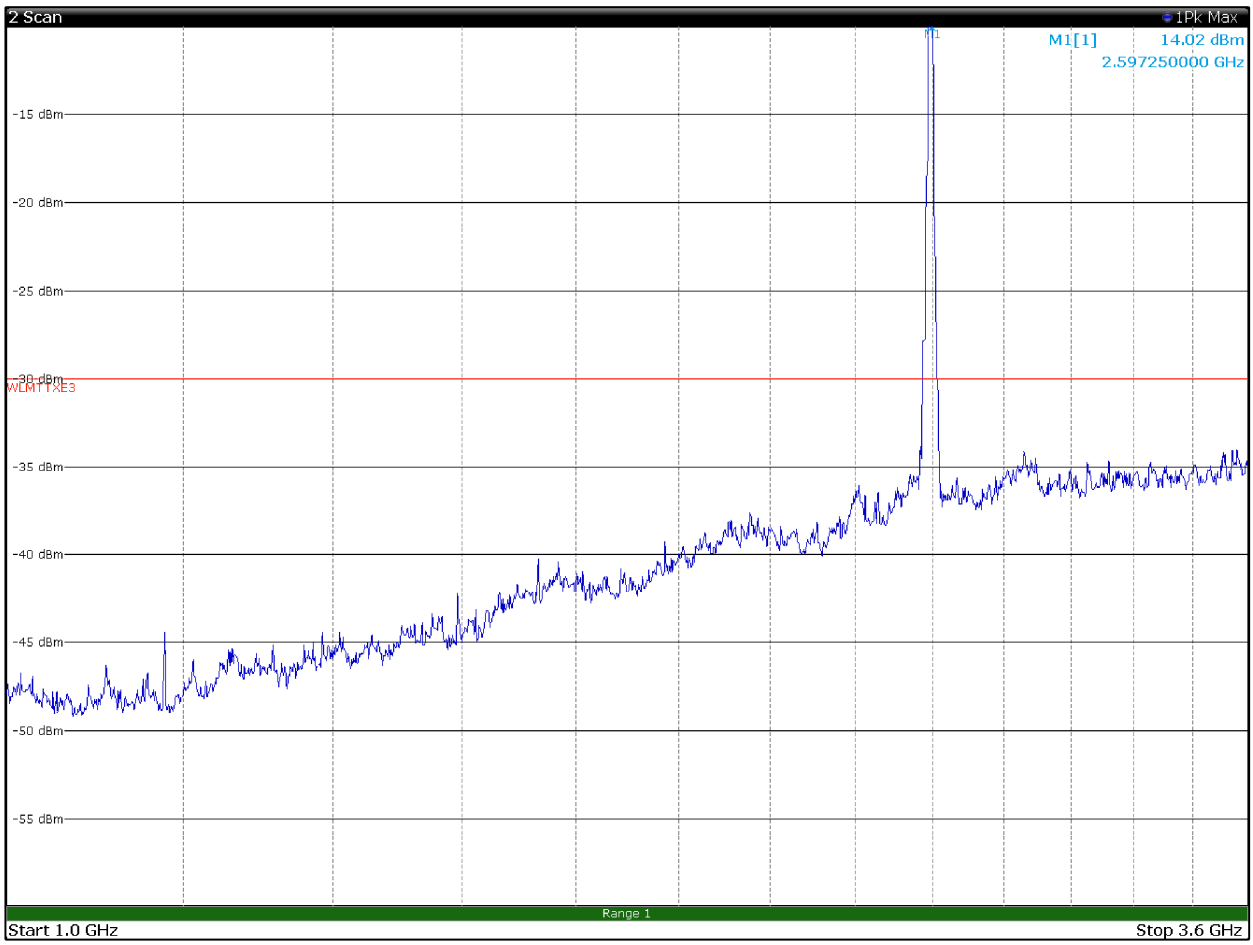
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B38
Remarks: Frequency range 30 to 1000 MHz



Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B38
Remarks: Frequency range 30 to 1000 MHz

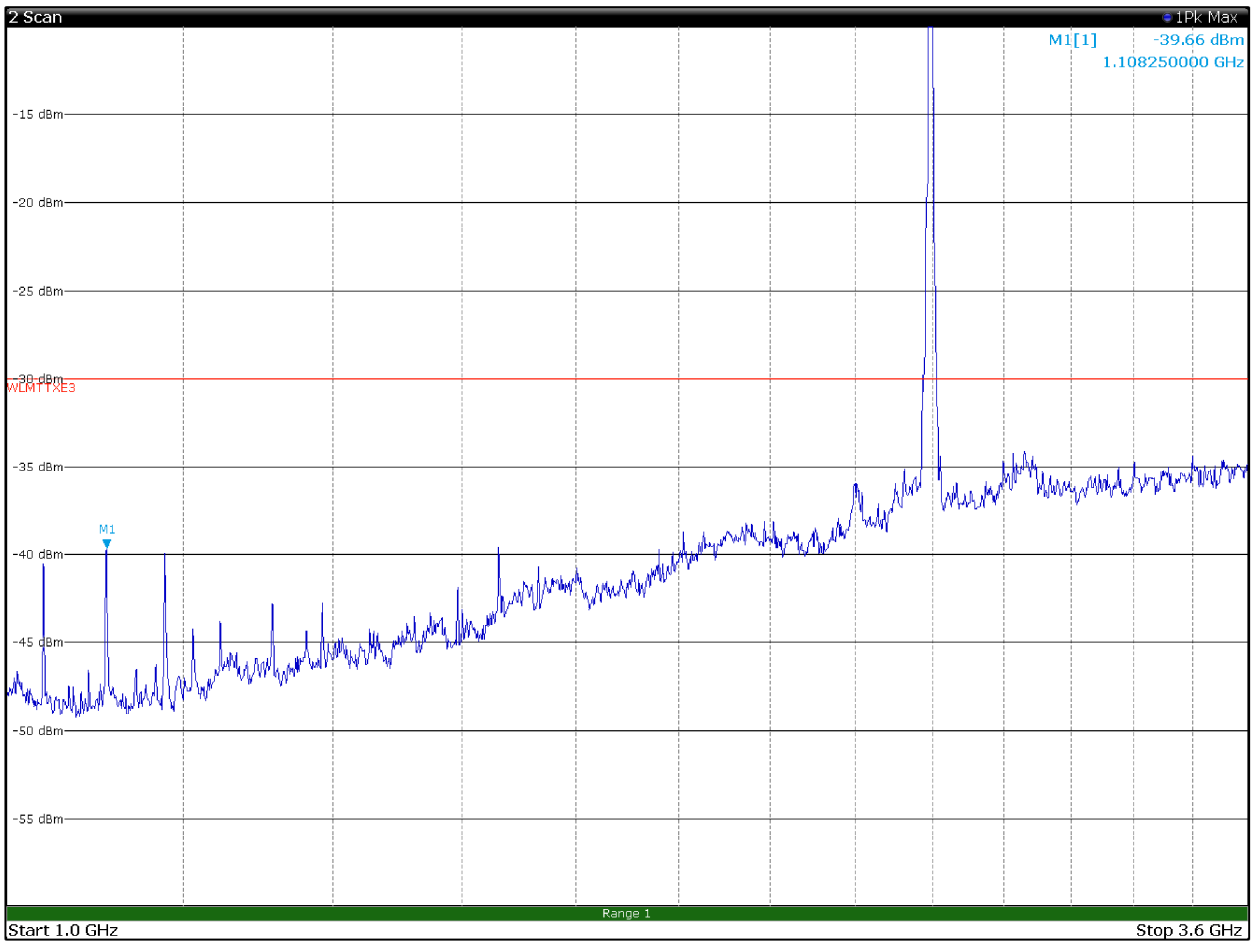


Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B38
Remarks: Frequency range 1 to 3.6 GHz



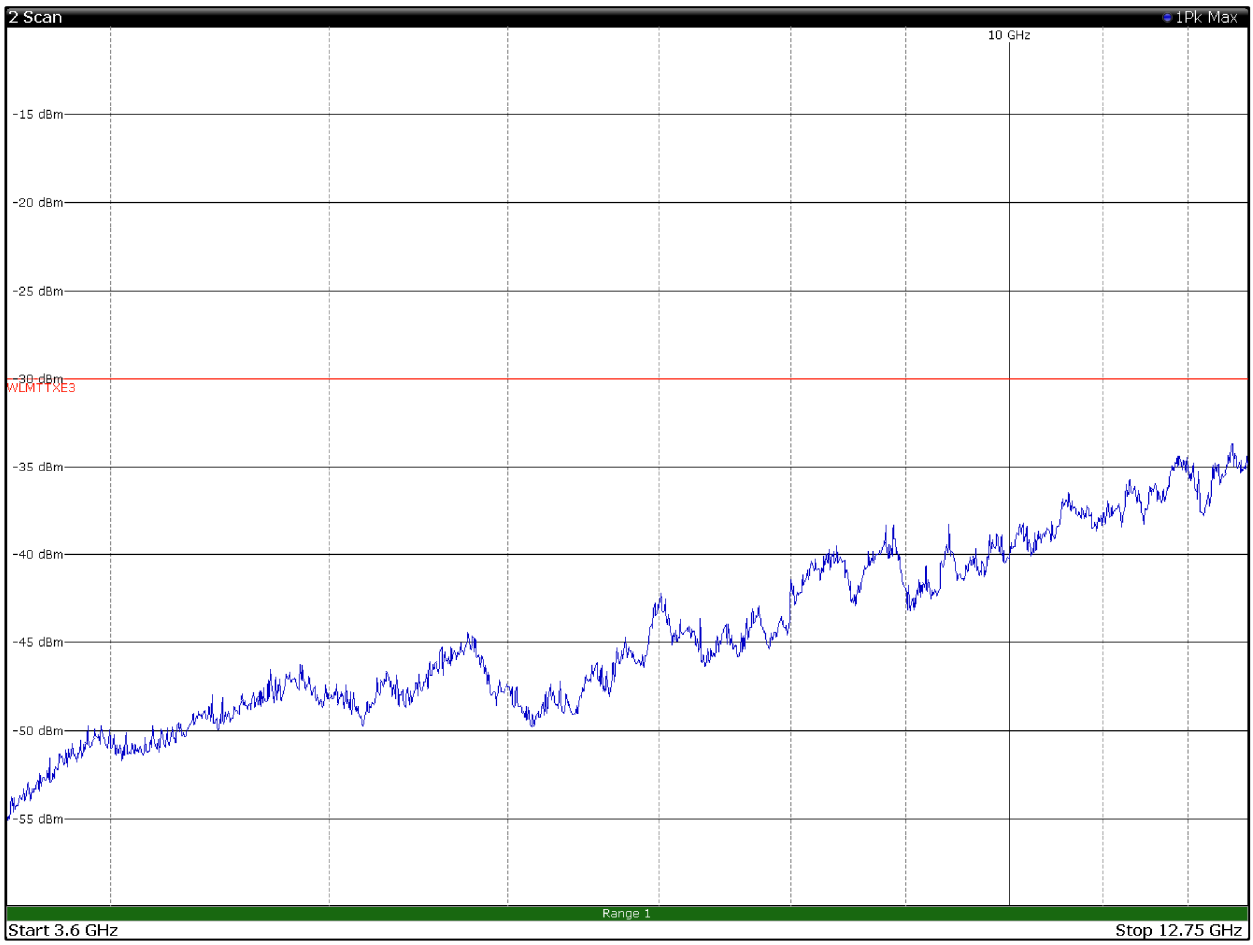
Limit exceeded by the carrier

Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B38
Remarks: Frequency range 1 to 3.6 GHz

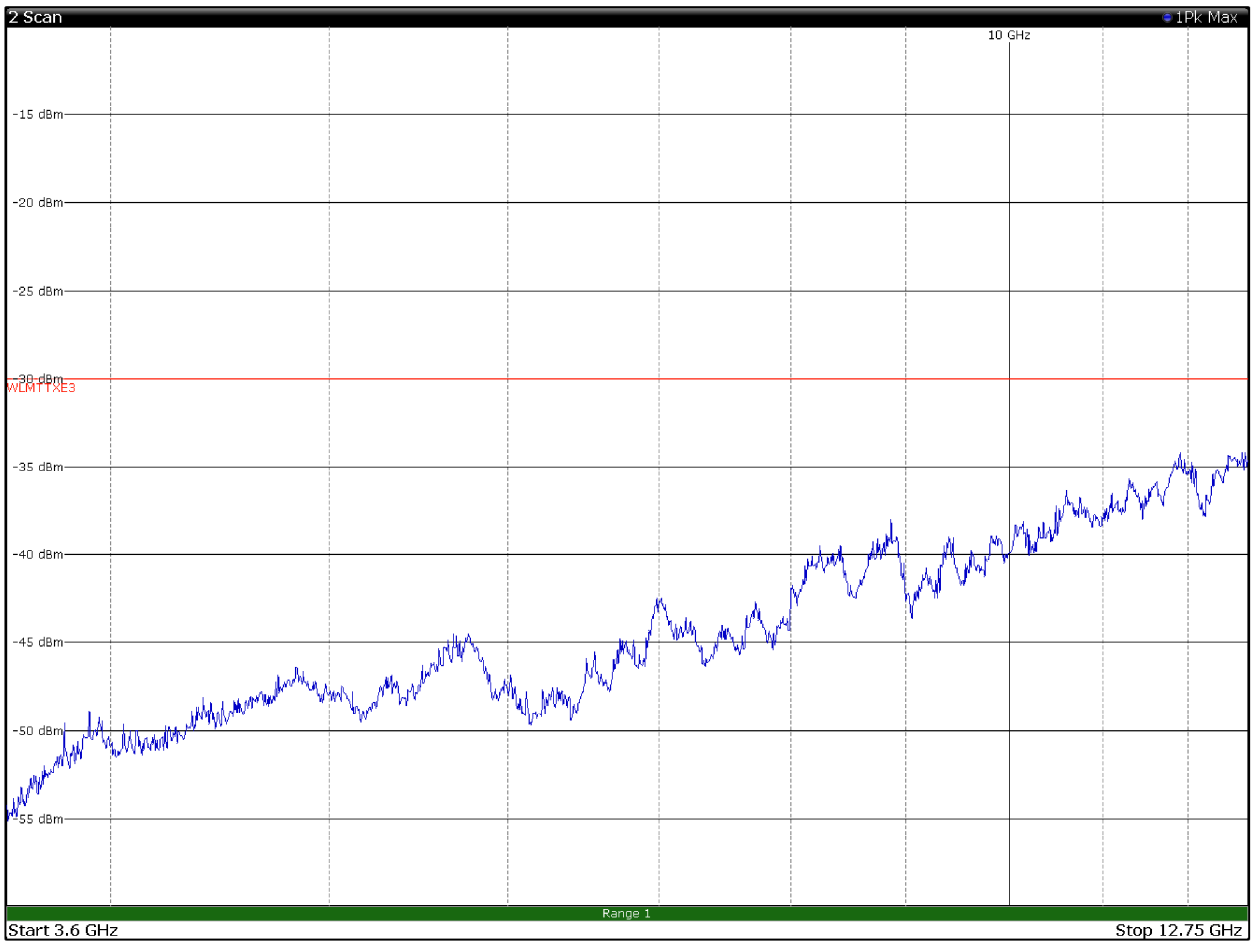


Limit exceeded by the carrier

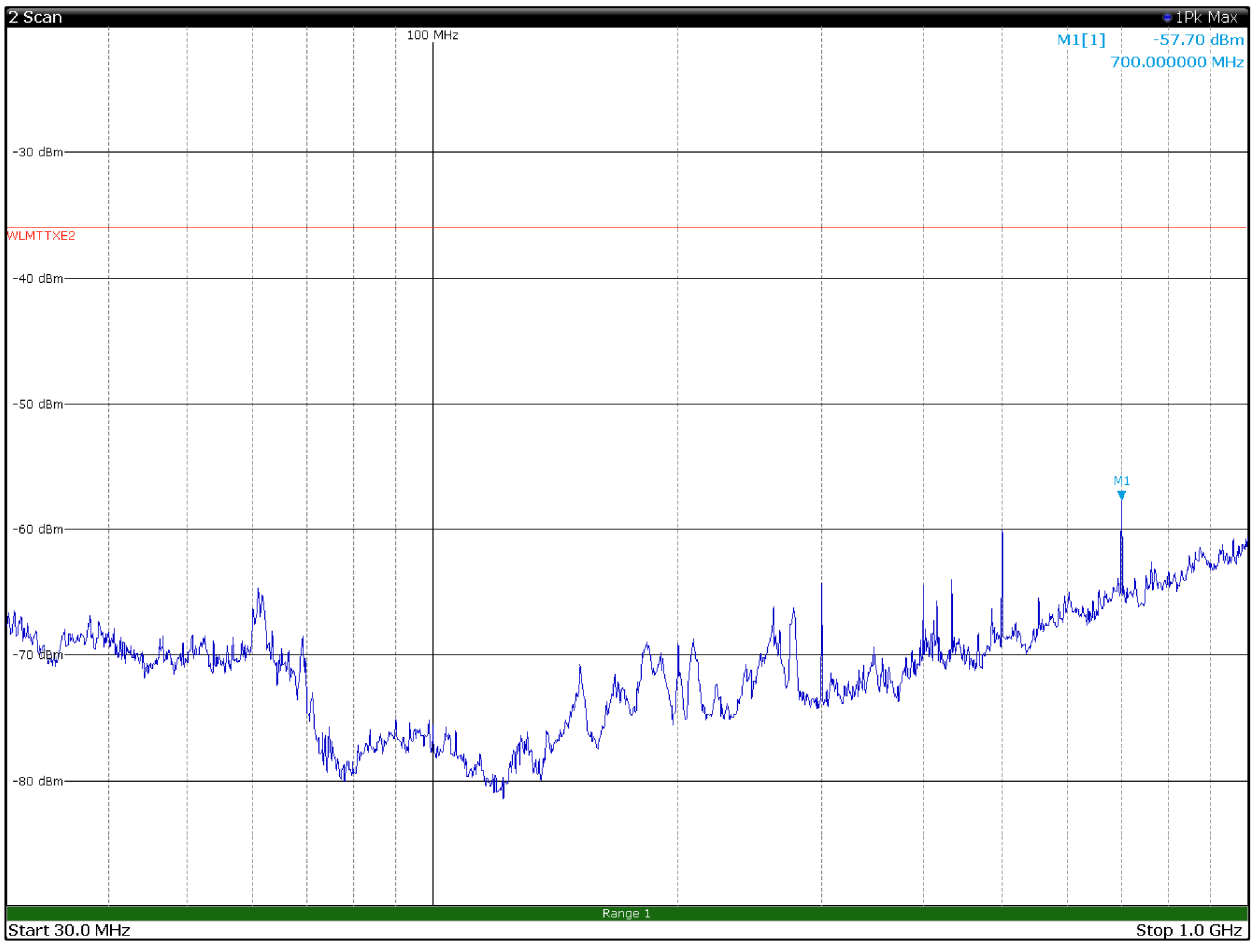
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B38
Remarks: Frequency range 3.6 to 12.75 GHz



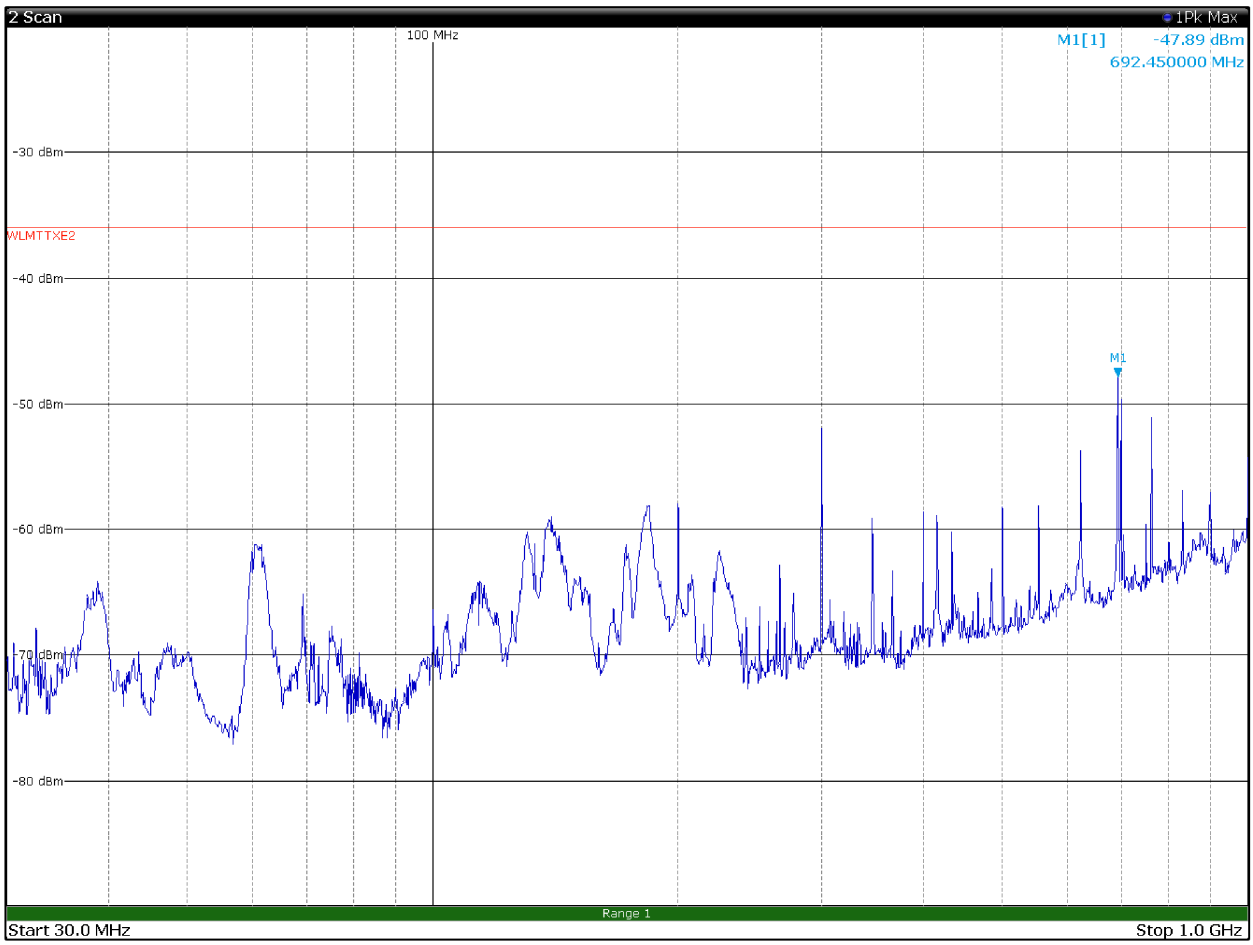
Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B38
Remarks: Frequency range 3.6 to 12.75 GHz



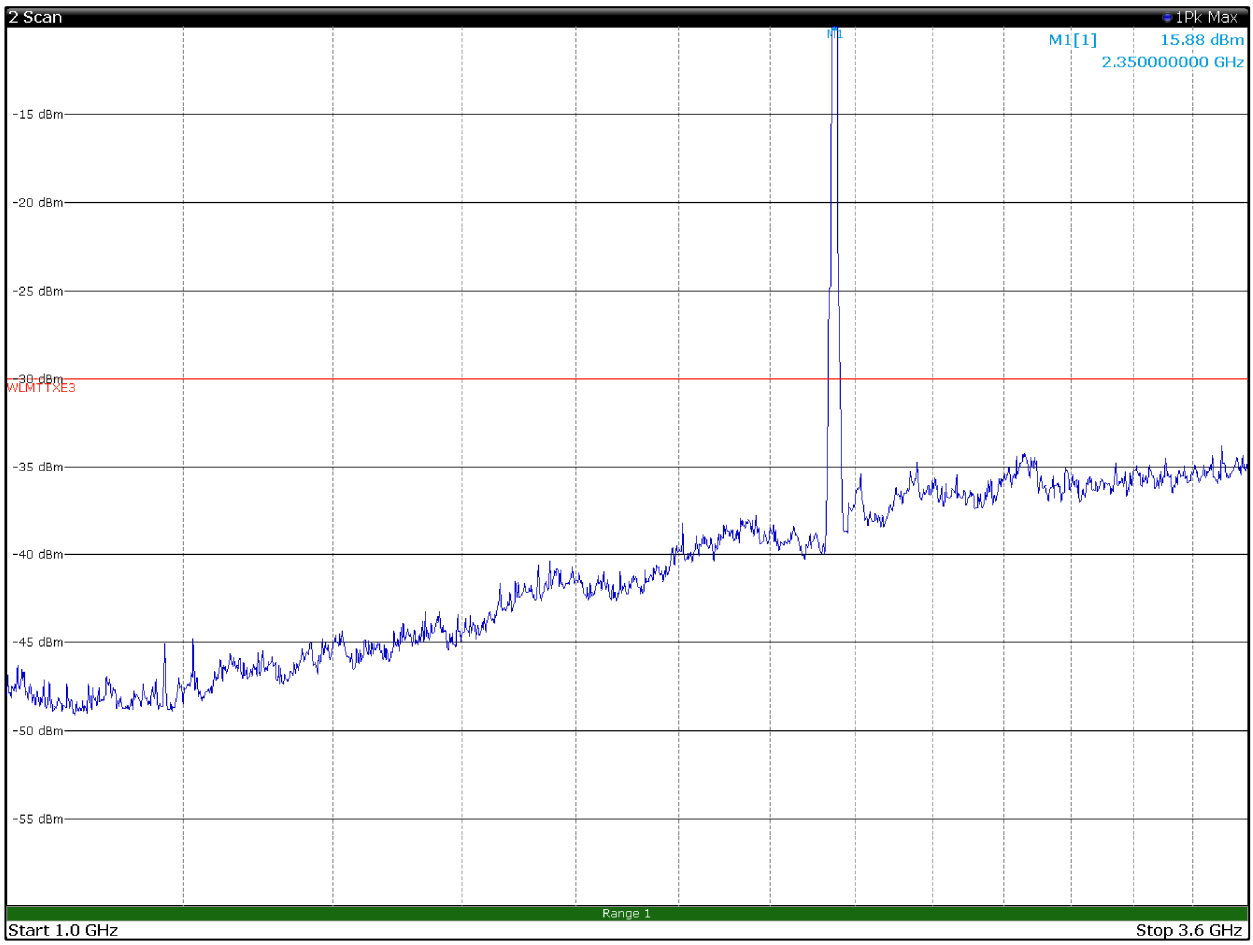
Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B40
Remarks: Frequency range 30 to 1000 MHz



Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B40
Remarks: Frequency range 30 to 1000 MHz

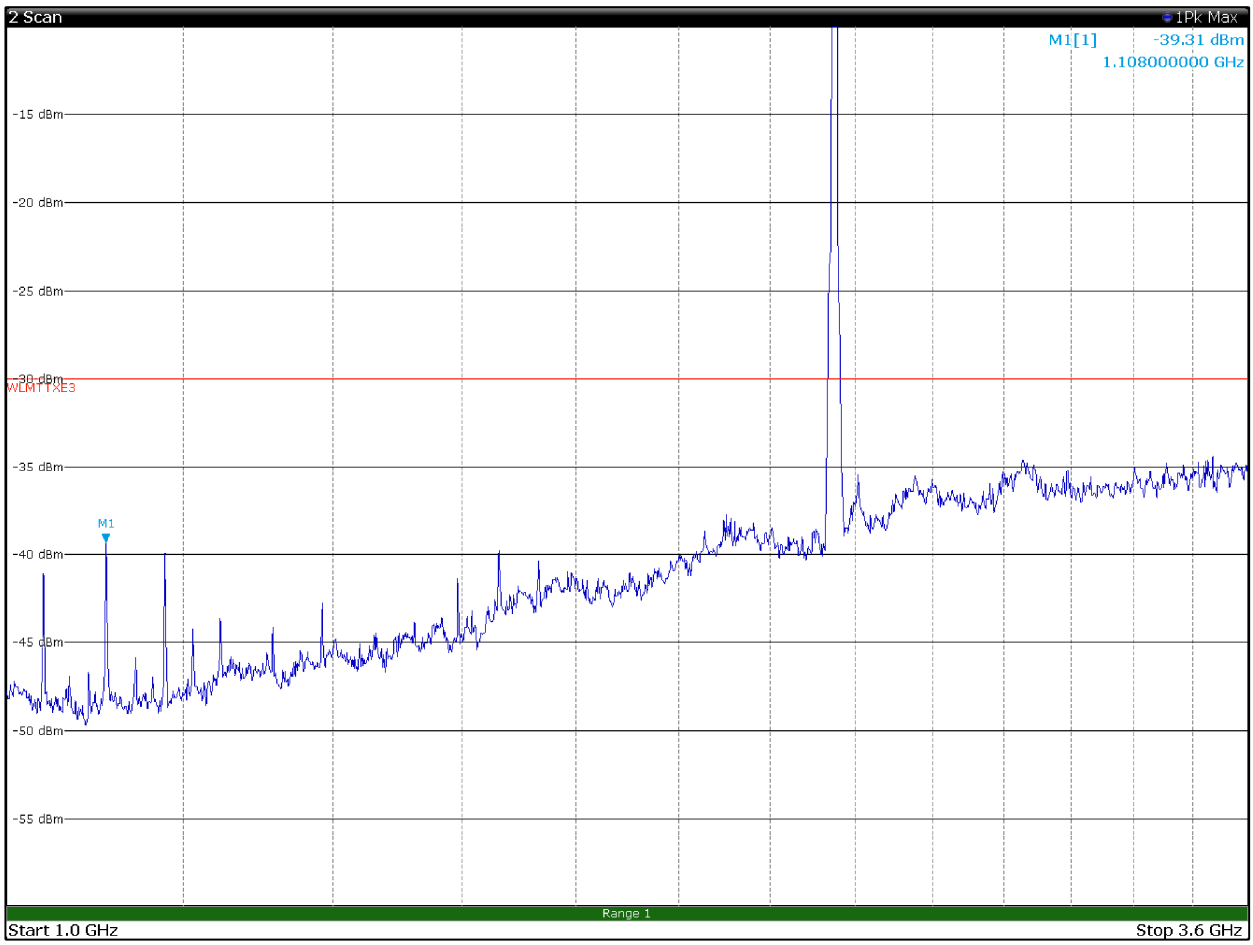


Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B40
Remarks: Frequency range 1 to 3.6 GHz



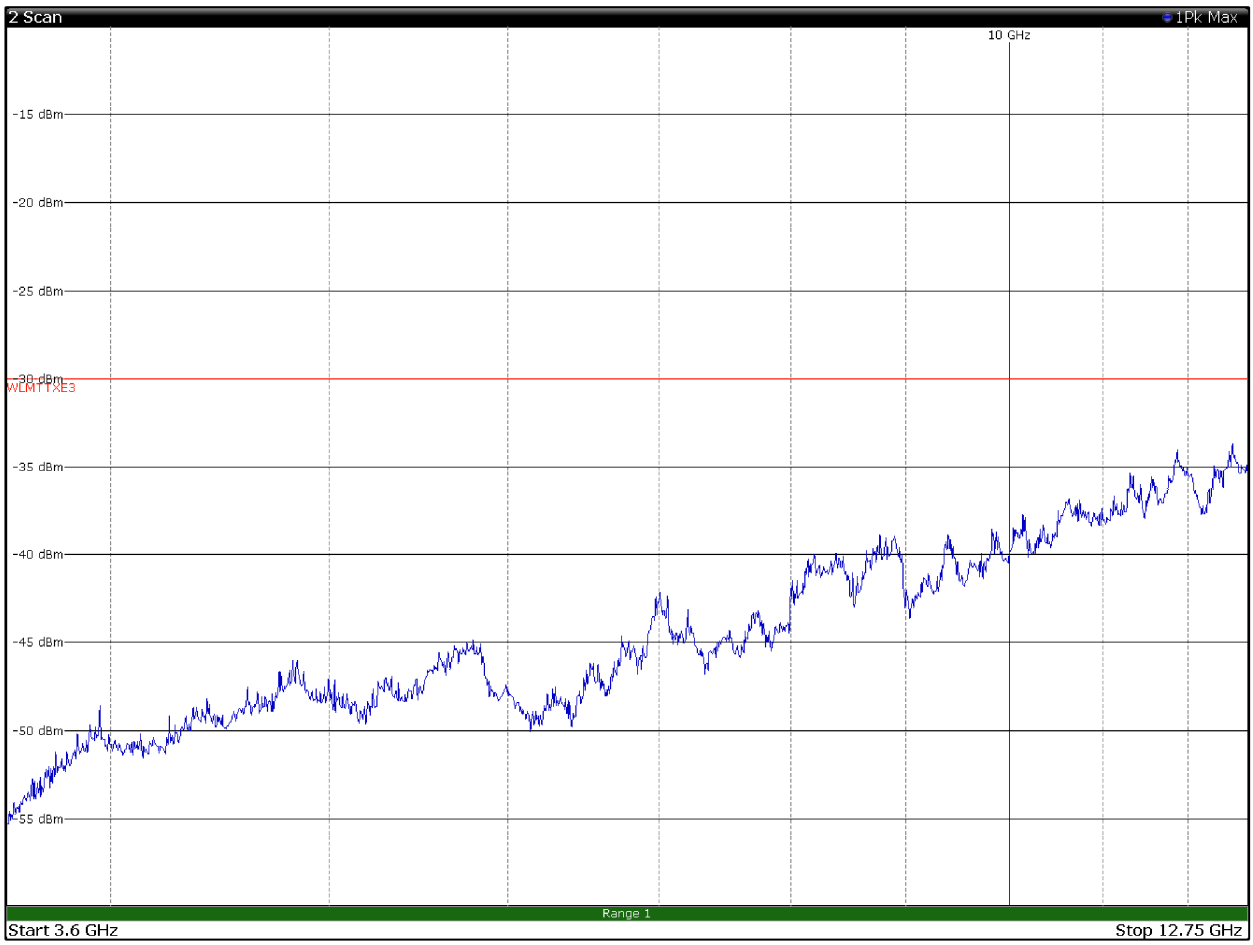
Limit exceeded by the carrier

Antenna polarization:	Vertical	Verdict: Pass
Operation mode:	1	
Configuration mode:	1	
Band:	B40	
Remarks:	Frequency range 1 to 3.6 GHz	

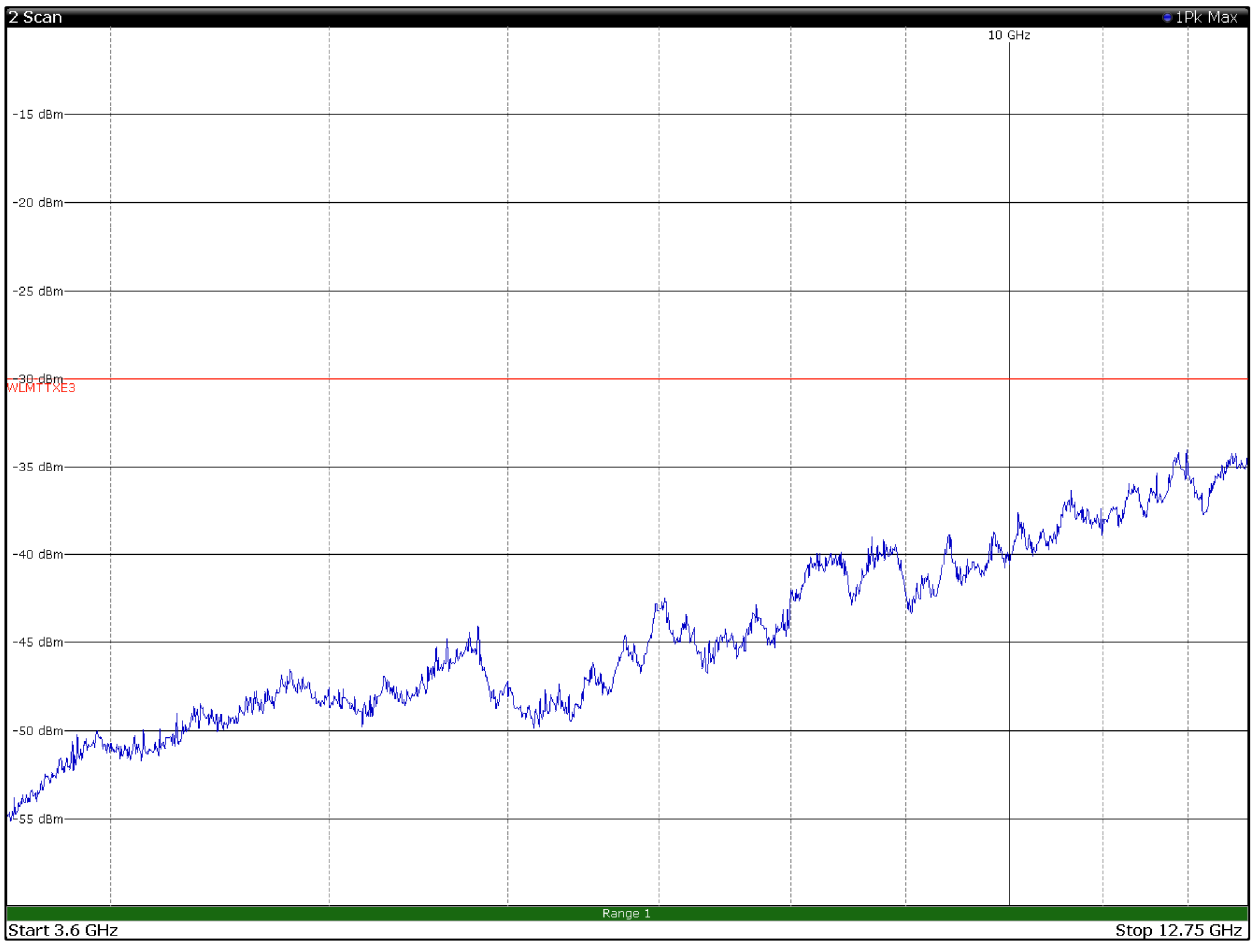


Limit exceeded by the carrier

Antenna polarization: Horizontal Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B40
Remarks: Frequency range 3.6 to 12.75 GHz



Antenna polarization: Vertical Verdict: Pass
Operation mode: 1
Configuration mode: 1
Band: B40
Remarks: Frequency range 3.6 to 12.75 GHz



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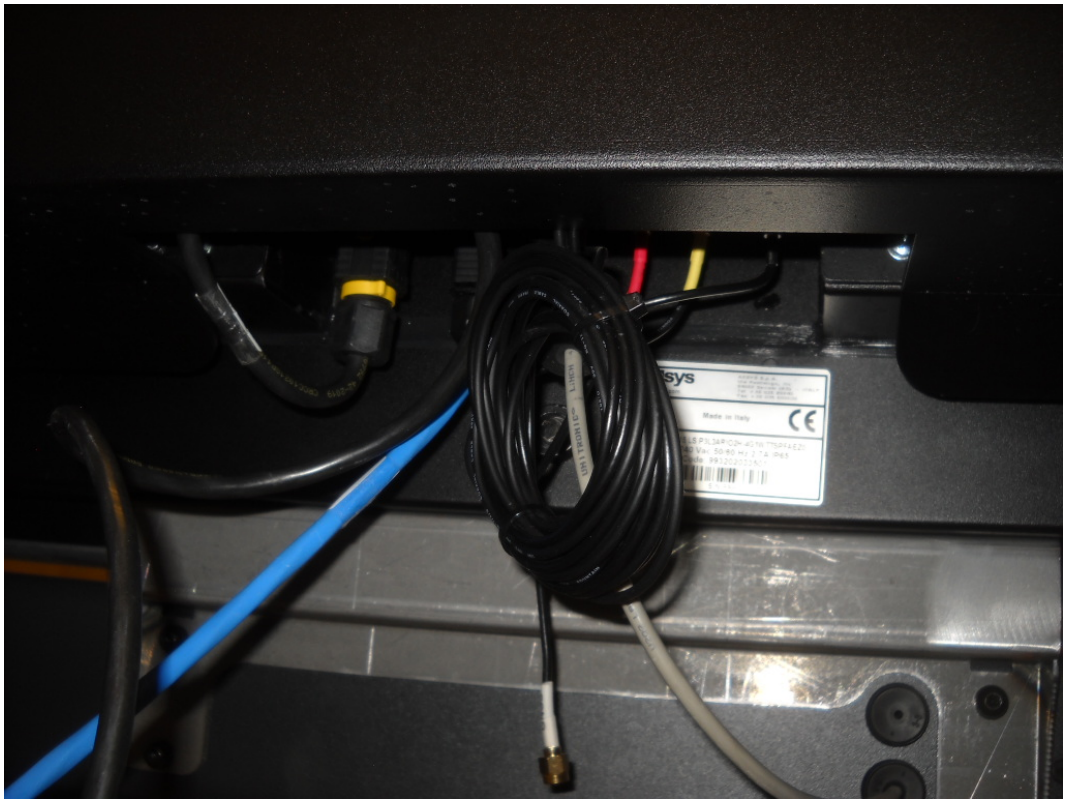

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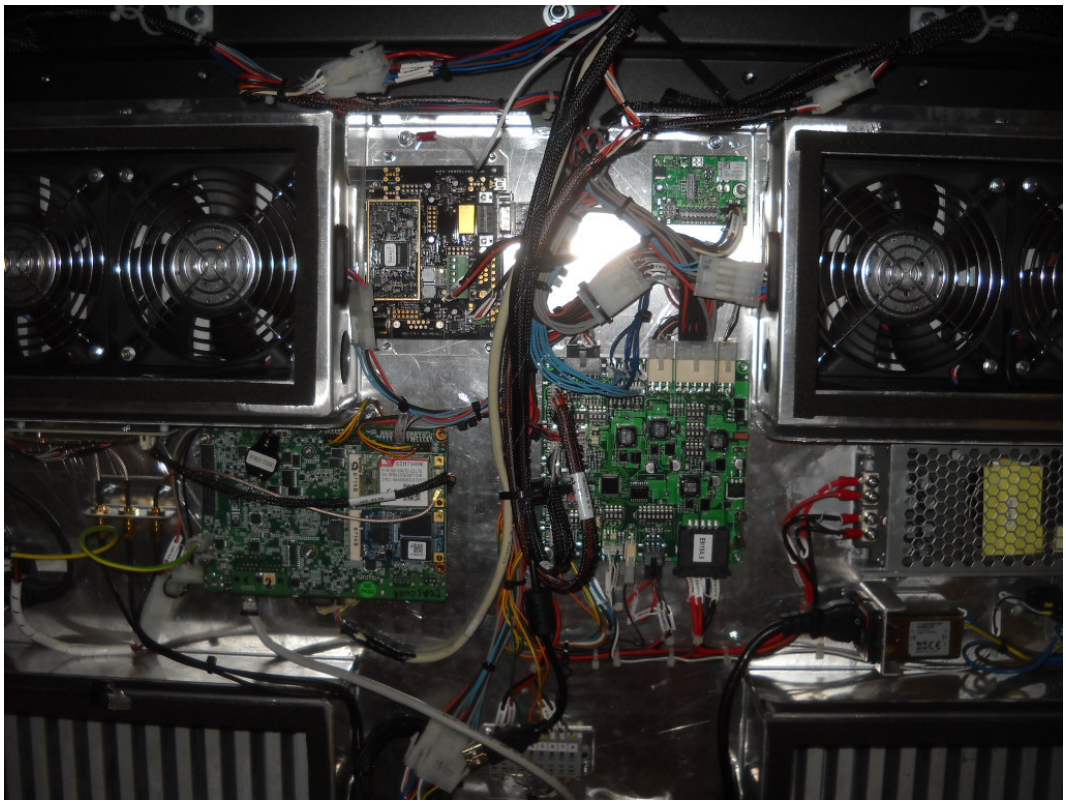

End of report